THE APPLE II MAGAZINE

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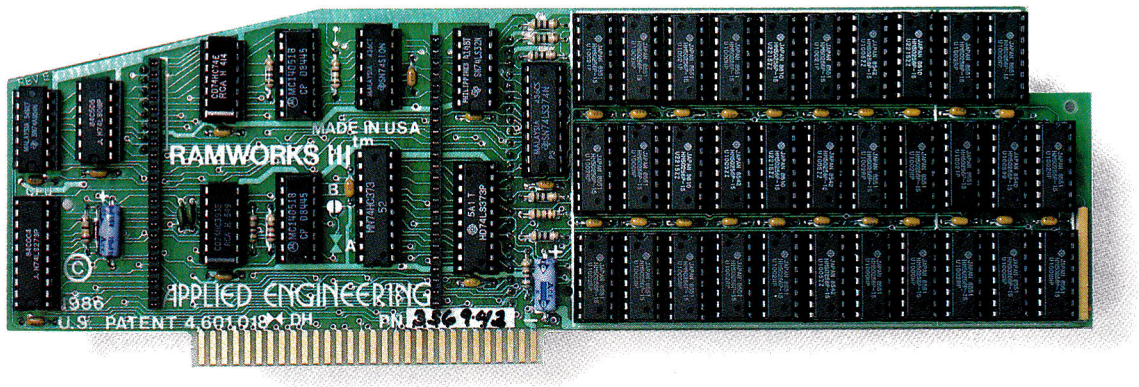



*With battery backed RAM port, RGB port, increased memory capacity, full software compatibility and more compact design, RamWorks III is a generation ahead.*

RamWorks III is the newest 3rd generation RAM card for the Apple IIe. It incorporates all of the technology and improvements that years of experience and over a hundred thousand sales have given us. By selling more memory cards than anyone else and listening to our customers, we were able to design a memory card that has the ultimate in performance, quality, compatibility and ease of use. A design so advanced it's patented. We call it RamWorks III, you'll call it awesome!

## The AppleWorks Amplifier.

While RamWorks III is recognized by all memory intensive programs, NO other expansion card comes close to offering the multitude of enhancements to AppleWorks that RamWorks III does. Naturally, you'd expect RamWorks III to expand the available desktop, after all Applied Engineering was a year ahead of everyone else *including Apple* in offering more than 55K, and we still provide the largest AppleWorks desktops available. But a larger desktop is just part of the story. Look at all the AppleWorks enhancements that even Apple's own card does not provide and *only* RamWorks III does. With a 256K or larger RamWorks III, *all* of AppleWorks (including printer routines) will automatically load itself into RAM dramatically increasing speed by eliminating the time required to access the program disk drive. Switch from word processing to spreadsheet to database at the speed of light with no wear on disk drives.

*Only* RamWorks eliminates AppleWorks' internal memory limits, increasing the maximum number of records available from 1,350 to over 25,000. *Only* RamWorks increases the number of lines permitted in the word processing mode from 2,250 to over 15,000. And *only* RamWorks offers a built-in printer buffer, so you won't have to wait for your printer to stop before returning to AppleWorks. RamWorks even expands the clipboard. And auto segments large files so they can be saved on two or more disks. You can even have Pinpoint or MacroWorks and your favorite spelling checker in RAM for instant response.

RamWorks, nothing comes close to enhancing AppleWorks so much.

## The Most Friendly, Most Compatible Card Available.

Using RamWorks III couldn't be easier because it's compatible with more off-the-shelf software than any other RAM card. Popular programs like AppleWorks, Pinpoint, Catalyst, MouseDesk, Howard-Soft, FlashCalc, Pro-Filer, Managing Your Money, SuperCalc 3a, and MagiCalc to name a few (and *all* hardware add on's like ProFile and Sider hard disks). RamWorks is even compatible with software written for Apple cards. But unlike other cards, RamWorks plugs into the IIe auxiliary slot providing our super sharp 80 column text (U.S. Patent #4601018) in a completely integrated system while leaving expansion slots 1 through 7 available for other peripheral cards.

RamWorks III is compatible with all Apple IIe's, enhanced, unenhanced, American or European versions.

## Highest Memory Expansion.

Applied Engineering has always offered the largest memory for the IIe and RamWorks III continues that tradition by expanding to 1 full MEG on the main card using standard RAMs, more than most will ever need (1 meg is about 500 pages of text)...but if you do ever need more than 1 MEG, RamWorks III has the widest selection of expander cards available. Additional 512K, 2 MEG, or 16 MEG cards just snap directly onto RamWorks III by plugging into the industry's only low profile (no slot 1 interference) fully decoded memory expansion connector. You can also choose non-volatile, power independent expanders allowing permanent storage for up to 20 years.

## It Even Corrects Mistakes.

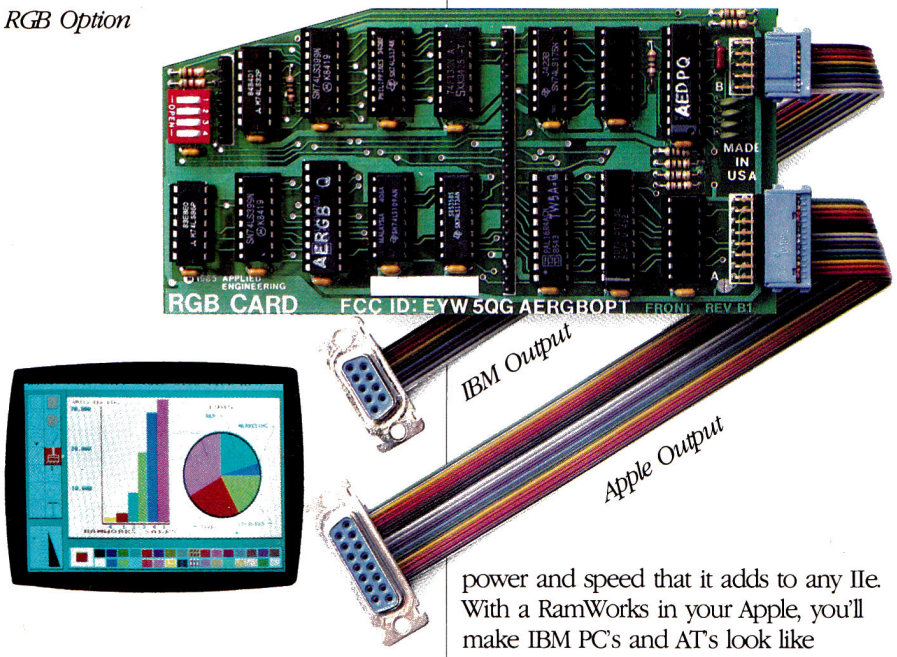
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

## The Ultimate in RGB Color.

RGB color is an option on RamWorks and with good reason. Some others combine RGB color output with their memory cards, but that's unfair for those who don't need RGB *and* for those that do. Because if you don't need RGB

Applied Engineering doesn't make you buy it, but if you want RGB output you're in for a nice surprise because the RamWorks RGB option offers better color graphics plus a more readable 80 column text (that blows away any composite color monitor). For only $129 it can be added to RamWorks giving you a razor sharp, vivid brilliance that most claim is the best they have ever seen. You'll also appreciate the multiple text colors (others only have green) that come standard. But the RamWorks RGB option is more than just the ultimate in color output because unlike others, it's fully compatible with all the Apple standards for RGB output control, making it more compatible with off-the-shelf software. With its FCC certified design, you can use almost any RGB monitor because only the new RamWorks RGB option provides both Apple standard and IBM standard RGB outputs (cables included). The RGB option plugs into the back of RamWorks with no slot 1 interference and remember you can order the RGB option with your RamWorks or add it on at a later date.

*RGB Option*




## True 65C816 16 Bit Power.

RamWorks III has a built-in 65C816 CPU port for direct connection to our optional 65C816 card. The only one capable of linearly addressing more than 1 meg of memory for power applications like running the Lotus 1-2-3™ compatible program, VIP Professional. Our 65C816 card does not use another slot but replaces the 65C02 yet maintains full 8 bit compatibility.

## Endorsed by the Experts.

A+ magazine said "Applied Engineering's RamWorks is a boon to those who must use large files with AppleWorks...I like the product so much that I am buying one for my own system." inCider magazine said "RamWorks is the most powerful auxiliary slot memory card available for your IIe, and I rate it four stars...For my money, Applied Engineering's RamWorks is king of the hill."

*"I wanted a memory card for my Apple that was fast, easy to use, and very compatible; so I bought RamWorks."*

*Steve Wozniak, the creator of Apple Computer*

Apple experts everywhere are impressed by RamWorks's expandability, versatility, ease of use, and the sheer power and speed that it adds to any IIe. With a RamWorks in your Apple, you'll make IBM PC's and AT's look like slowpokes.

## Quality and Support of the Industry Leader

RamWorks III is from Applied Engineering, the largest, most well supported manufacturer of Apple peripherals and the inventor of large RAM cards for the Apple. With our 5 year no hassle warranty and outstanding technical support, you're assured of the most trouble free product you can buy.

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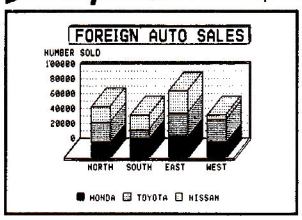


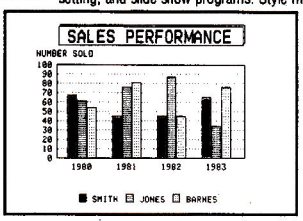


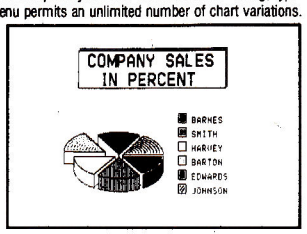


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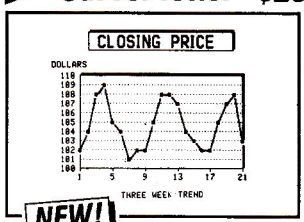


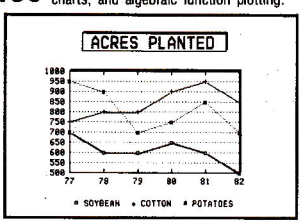


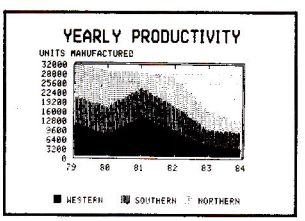


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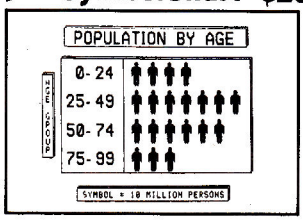


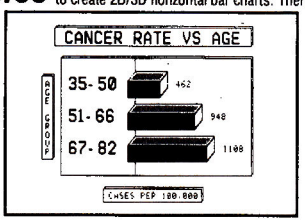


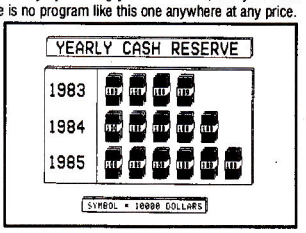


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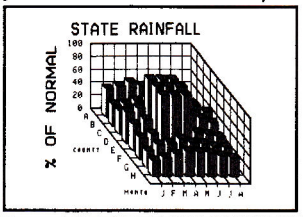


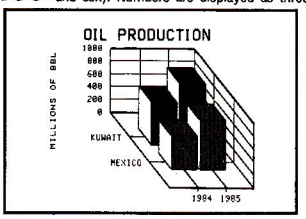


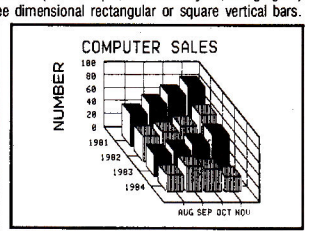


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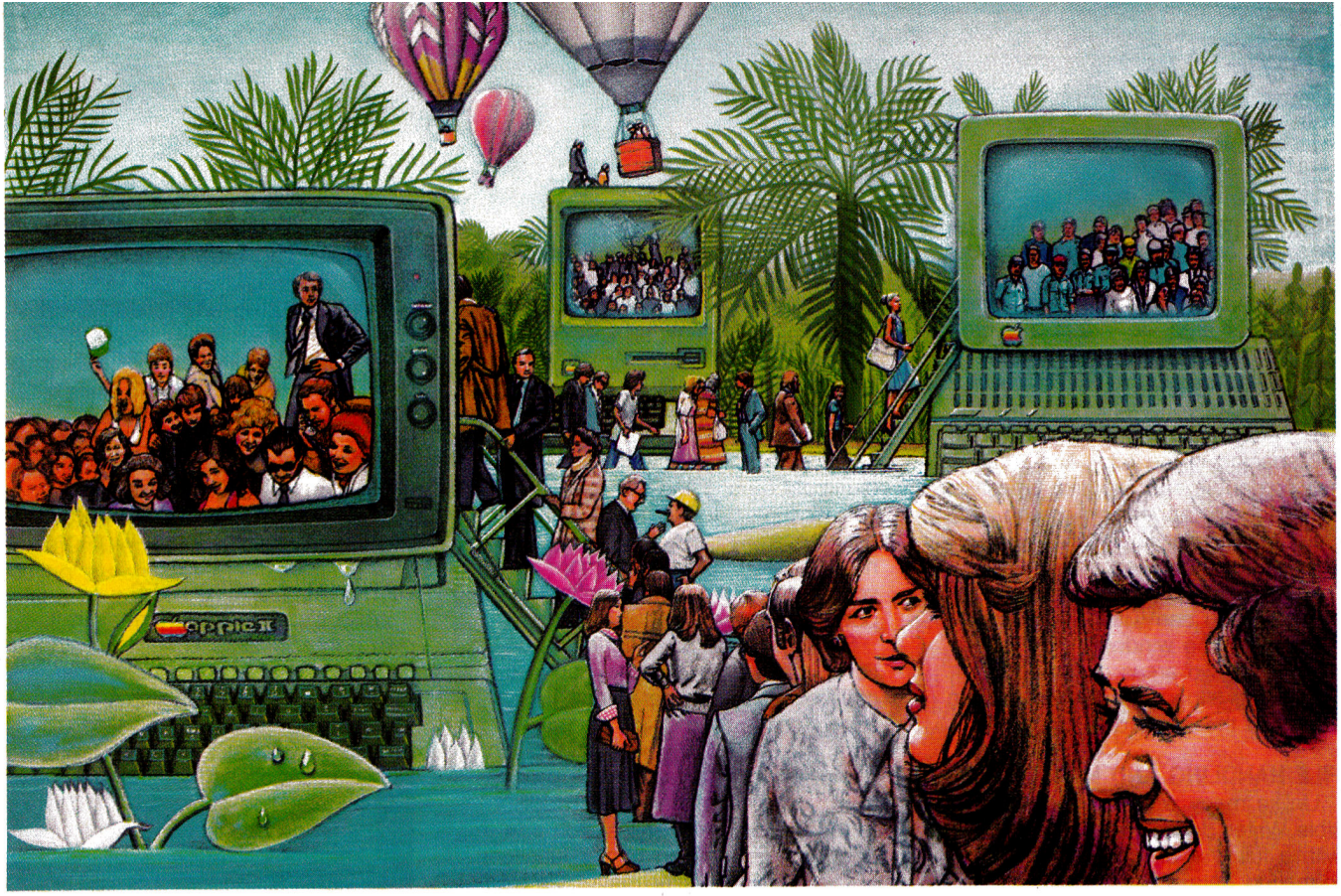

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# inCider

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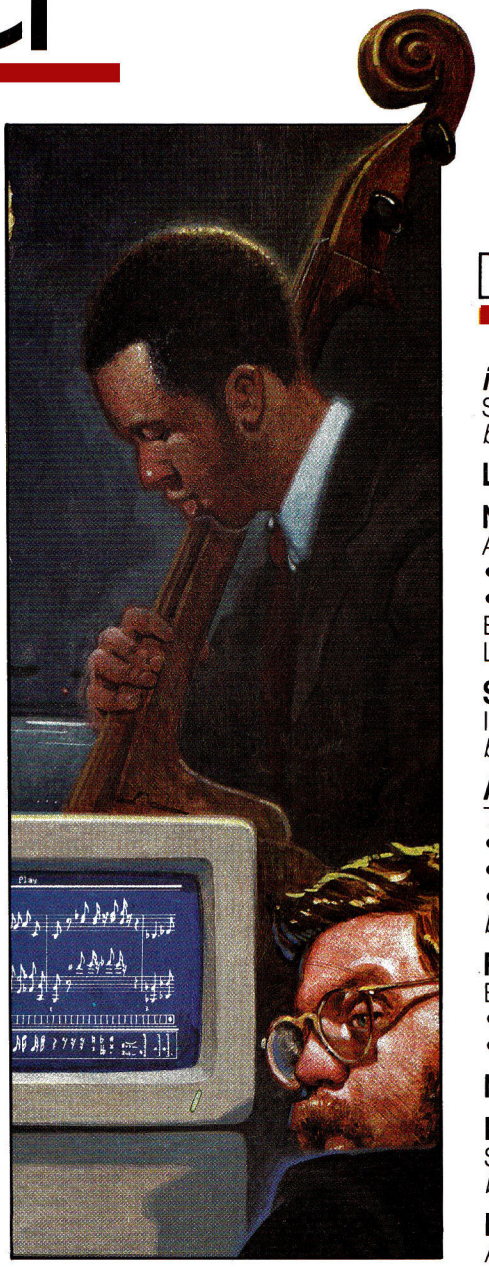
August 1987

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# Support Your Local User Group

by Deborah de Peyster, Editor in Chief

*"Informal exchange of information is the user group's greatest strength."*

Where do you go when you want advice on a new Apple II product? We hope you use *inCider* as one source of information, but we also encourage you to talk to your local user group.

You remember user groups, right? They're those skinny guys in white shirts, black pants, and two-inch-thick glasses. They meet in basements and spend most of their time peering into dimly lit computer innards. Right?

Wrong. User groups represent male and female professionals, who are among the savviest computer users around. They're the first to adopt new technology; they quickly discover software or hardware glitches; and they offer the first solutions to those problems.

People join user groups such as the Boston Computer Society to "get unbiased information, try new products, and benefit from other users' experience," says Mary McCann, the Society's executive director. The Apple II subgroup has about 2500 members. A new business club is just beginning, and McCann expects it to become one of the larger special-interest groups at the Society.

The MinneApples Computer User Group has seen a trend away from members interested in programming to those interested in running small businesses from their homes, says Vice President Ed Spitler. "Our membership by and large is very end-user oriented. And people join to learn more about how to use the computer the way they want."

User groups also know where to buy products—which mail-order firm or dealer provides the best service and is most reliable. A dealer or mail-order firm that doesn't support the products it sells won't last long on the user group's recommendation list.

Informal exchange of information is the user group's greatest strength. Says Spitler, "In just two years, I've learned so much from the user group it's incredible."

User groups are working to offer their members even more—such as better purchasing options through cooperative arrangements with local dealers. But putting those arrangements together isn't easy.

Dealers haven't always recognized the user group's potential for influencing buying patterns. As a spokesman from the Arizona Users Group said at a recent forum, "We are the opinion leaders. We are a distribution method to reach a cross-section of users already targeted by most of the major manufacturers. But we aren't being used that way."

The need to build a better relationship with dealers was the subject of a recent user-group meeting in Los Angeles. Sponsored by Apple Computer Inc., in conjunction with AppleWorld Expo, the gathering brought together user-group representatives from across the nation. One of their main concerns was how to set up special purchasing arrangements for members and how to let dealers know about the technical training and support they provide.

Inviting dealers to user-group meetings, sending them copies of the local group's newsletter, going to their stores to talk with them, and giving them a free log-on to the user-group bulletin board were among some of the ideas for encouraging better relations. And all of those ideas were aimed at achieving better buying arrangements for the group's members—end users.

That could be you. Have you talked to your local user group yet? What are you waiting for?■

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# LETTERS

## Abracadata Responds

We'd like to correct some misinformation, both stated and implied, in "Apple's Victory Garden" (June 1987, p. 50).

Abracadata's program Design Your Own Home: Landscape received too high a rating as a gardening program. It's a poor gardening program. There's a good reason for that, however: It's not a gardening program, nor was it ever meant to be, nor did we ever pretend it was.

Design Your Own Home: Landscape is exactly what it sounds like—a computer-aided-design (CAD) program for landscaping your home. If Ms. Field had compared it to other landscape-design tools, we're sure she would have found, as thousands of our customers have, that it's one of the best in its category. In May 1987, *inCider* published a favorable review of our Design Your Own Home series ("The Designing Apple," p. 36), including information on happy users of Landscape.

Ms. Field recommended that we all go out and buy Ortho's Computerized Gardening, and that our landscape program should "go back to the drawing board." We tried Ortho's program and found that it's mostly a book, with a disk. The book contains details on caring for plants; the disk includes regional and planting data. There's no CAD, nor was there meant to be.

There's no comparison, since Ortho does as bad a job at being CAD as Landscape does at being a gardening database. Ortho deserves high marks for being good at what it does, as does Landscape. What's unfair is comparing Landscape to gardening-database programs. Abracadata produces both good CAD and good database software. We never confuse the two, however.

Two corrections: Ms. Field's article states that our series prints double-hi-res pictures. It doesn't. It prints single-hi-res, and therefore requires only 48K, as opposed to requiring 128K with double-hi-res, which also uses twice as much disk space.

Ms. Field also states that we "claim" to support lots of printers and interfaces. We don't just claim it—we do. Our print routines are licensed from Beagle Bros and do a wonderful job of producing hardcopy with more than 50 printers and 64 interface cards.

**Mary Carol Smith, Don Fudge**
**Abracadata Ltd.**
**P.O. Box 2440**
**Eugene, OR 97402**

## Partitioning with MultiRam

I'm amazed, amused, confounded, astonished, and astounded by the following statement in "Pumping Up the IIe" (May 1987, p. 44): "RAM-expansion cards such as Checkmate's MultiRam also increase the size of AppleWorks' desktop, but only Applied offers a special partition program, too."

I've been using MultiRam for almost two years with a 448K RAM disk and a 64K RAM disk running concurrently; this leaves me with a 91K desktop. I keep the RAM-disk software in my external drive at all times, with AppleWorks and Document Checker (plus dictionaries) in the big RAM disk, and a graphics program or a data disk in the main drive. I never turn off my Apple—I simply reboot with Bird's Better Bye from any disk and go. If I want to go into BASIC, the BASIC.SYSTEM kernel is in the RAM-disk software, and I call it; when I want to exit, I just type BYE and go where I want.

It's a shame you've printed incorrect information about a fine system such as Checkmate's. One other thing—my system is an "entry-level" IIc, a machine you have a hard time admitting exists.

**W.S. Massey**
**Massey Lumber Agency**
**P.O. Box 171222**
**Memphis, TN 38187-1222**

*We apologize. Checkmate's memory-expansion software certainly offers partitioning and a RAM disk. In fact, according to Checkmate Vice President Ron LaMee, Checkmate developed its software two years ago, "well before Applied Engineering."*

*We're not taking sides in that debate, but we do agree that Checkmate offers an easy-to-use option for partitioning its expansion memory. —eds.*

## Conquering Praise

Your readers deserve another opinion of Lords of Conquest (Games Editors Play, April 1987, p. 94). Mr. Statt's notes on the game are misleading and too short to do justice to what some of us think is one of the best Apple II games. If you like Risk, you'll love Lords.

In Lords, you use natural resources to build either weapons or cities. You win the game by building the required number of cities and holding them for a year. Combat is based on territorial position and the added strength of your horses, boats, weapons, and cities. The challenge is in striking the right balance between keeping up with your opponent's cities, and building enough weapons to defend what you have and take what you need. The game's map generator is so flexible, there's no end to the variety of maps on which you can play. Each map provides a new set of territorial problems.

Contrary to what Mr. Statt says, I find the color graphics clear, precise, and delightful. Everything you need to know about your enemy's position is right there in front of you. And how can he compare Lords to Balance of Power? The only similarity I see is that both games are played on a map. Did he try the nifty handicap feature? You can play the game at nine levels of difficulty, and either you or the computer can have the advantage.

**Rick Kesler**
**167 West California Avenue**
**Columbus, OH 43202**

## Laser Response

After reading "A Little Extra" (Letters, April 1987, p. 8), I thought you might like to hear from another Laser 128 owner. I, too, am having problems with the Laser and Central Point Software.

When my Laser locked up six months after I purchased it, I wrote to

Now the Fastest Memory Card for IIGS with New Disk-Caching Feature

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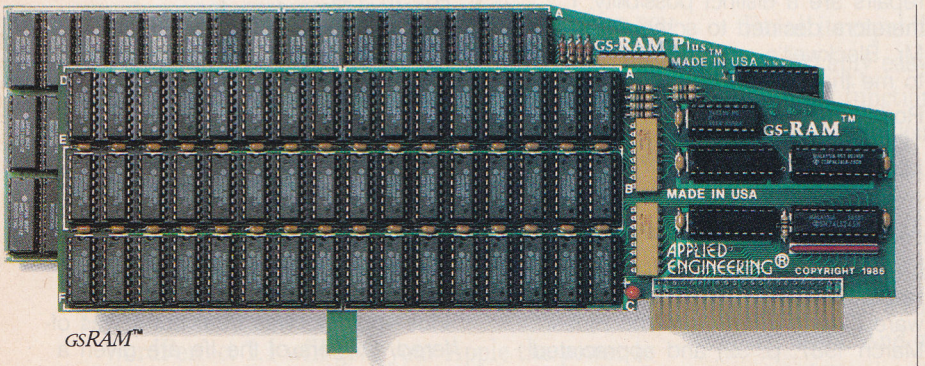


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Remember the 16K cards for the II+ and the 64K cards for the IIe? At the time, that much memory seemed like a lot. But when the owners of these memory cards came to us for more memory, many had to throw away their smaller Apple memory cards or try to sell them. Most of our customers told us that had they known about Applied Engineering's larger memory cards when they bought their Apple, they would have purchased them at the same time.

GSRAM and GSRAM Plus are available now, allowing up to 8 MEG of memory expansion. That's 8 times the memory capacity of Apple's card and just look at the benefits that only GSRAM and GSRAM Plus have over Apple's card:

- Lower cost
- Has 6 RAM banks (Apple's card has 4)
- Has memory expansion port
- Has ROM expansion port
- No configuration blocks to set
- No soldered in RAM chips
- Expandable to 8 MEG
- Expands AppleWorks internal limits
- Built-in Hi-Res self-diagnostic software
- 5 year hassle free warranty (Apple has a 90 day warranty)
- Made in USA

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Only GSRAM and GSRAM Plus eliminate AppleWorks internal memory limits, increasing the maximum number of records available from 6,000 to over 25,000 and only GSRAM and GSRAM Plus increase the number of lines permitted in the word processing mode from 6,000 to over 15,000. And only GSRAM and GSRAM Plus offer a built-in printer buffer so you can continue using Appleworks while your printer is printing. GSRAM and GSRAM Plus even expand the number of lines in the clipboard from 255 to 2047 and will auto segment large files so they can be saved on two or more disks. You can even have Pinpoint or Macroworks and your favorite spelling checker in RAM for instant response. GSRAM and GSRAM Plus will even display the time and date right on the AppleWorks screen. Nothing comes close to enhancing AppleWorks so much.

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Simply plug GSRAM into the IIGS memory expansion slot and you've got up to *8 megabytes* of RAM at your fingertips—all of it instantly and automatically recognized by the IIGS. GSRAM is compatible with all IIGS software, including AppleWorks, as well as BASIC®, ProDos, DOS 3.3, PASCAL®, "C" and CP/M®.

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*Steve Wozniak, the creator of Apple Computer*

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Central Point to inquire about repairs. I described the problems and asked about getting technical information and parts so that I could repair it myself. Central Point replied that its repair center works on a board-swap basis and could replace my circuit board: That indicates that no one read my letter to the end. Central Point also said it could fix my disk drive for about $80.

After reading "A Little Extra," I really wonder.

**Dennis Robinson**
**16 Country Club Estates**
**Pacific, MO 63069**

Wayne Blackwell's letter regarding his experiences with the Laser 128 was especially interesting to me. I purchased a Laser from Central Point Software, and it malfunctioned only 110 days later—unfortunately, 20 days after the warranty expired.

Unlike Mr. Blackwell's computer, my Laser's internal power supply failed, requiring a new main circuit board. I decided that if one part can fail so soon and cost so much to repair ($215), more failures and costly repairs are a distinct possibility. I therefore decided to scrap the Laser. Mr. Blackwell's experience indicates to me that I made the right decision.

**Rodney Schreiner**
**129 South Brittingham Place**
**Madison, WI 53715**

## Total Transfer

I enjoyed Cynthia Field's well-researched article on income-tax software ("Beating the Tax-Time Blues," March 1987, p. 32) and appreciated her comments on our program, Tax Command Professional.

However, Ms. Field commented that some tax programs don't transfer totals from the schedules to the 1040 form. Some readers may conclude that Tax Command Professional is one of them. In fact, our program does transfer all totals to Form 1040 (or to Schedule D, in the case of Form 2119).

**Bruce R. Thompson**
**President**
**Practical Programs, Inc.**
**P.O. Box 93104**
**Milwaukee, WI 53203**

## Polishing the Apple

Eric Grevstad asks why IIc users complain that Apple won't offer them a IIGS upgrade (E.G. For Example, April 1987, p. 24). Apple offered Macintosh XL (Lisa) owners a trade-in plan when it released the Macintosh Plus—nothing was free, but it was offered. Owners of the IIe are given a chance to upgrade, but IIc and II Plus users are left out. While we didn't pay as much for our computers as they, we should still get a chance to upgrade through either a logic-board swap (which is unlikely, as you and Apple have pointed out) or a plan by which IIc owners could trade up to a GS for $500 or so.

It seems that Apple's trying to pawn off the new memory board for the IIc as an alternative to the GS. From what I've heard, Apple's memory board requires installation of a new logic board as well, and moving the mouse port to slot 7 to put the memory board into slot 4 causes compatibility problems. If I wanted more memory, I'd go to one of the third-party developers for a board that doesn't require a logic-board swap.

We aren't looking for a free meal, just a chance to upgrade to the new technology. The IIGS is the future of the Apple II line. Just as the II Plus replaced the II and the IIe and IIc replaced the II Plus, the GS will become a standard. Why do we want an upgrade? We don't want to be left behind like II and II Plus people.

**Tim Voss**
**423 North Hillcrest**
**Vine Grove, KY 40175**

I agree with Eric Grevstad's statement (E.G. For Example, April 1987, p. 24) about IIc owners expecting an upgrade to the IIGS. However, I believe he was a trifle too critical of the IIc itself.

When Apple introduced the IIc, the standard IIe configuration was the Professional system with a DuoDisk drive, an 80-column card, and a monitor, all for about $1600. There was no printer card, serial port, or RGB-display capability, and an RF

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- Bold and underline text
- Center text
- Chaining of macros
- Comprehensive file management
- Date set/format/insertion
- Extensive printer/font definition
- Flush right
- Footnotes
- Headers and footers
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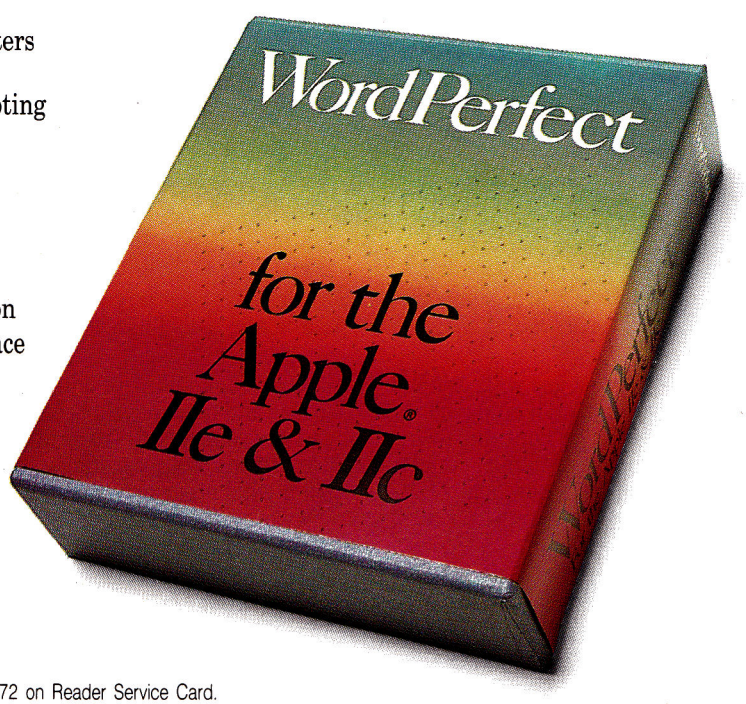


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modulator cost extra.

The IIc came with all the available IIe upgrades, but retailed for $1200 (with the monitor). The IIc was designed for those who wanted to use the computer, rather than tinker with a great hobby machine. It had faults, but, depending on your needs, was (and, I believe, still is) a very good alternative to the IIe. Incidentally, that's why I bought it.

In the future, I'd like to see a GS upgrade for the IIc, which I'd consider purchasing. But I don't expect to be handed one free. After all, Apple is a business, not a charity.

**Richard A. Hubbard III**
**2473 Parker Boulevard**
**Tonawanda, NY 14150**

## @ROUND and About

As a former math and computer coordinator, I found "AppleWorks-Assisted Instruction" (Teachers' Choice, April 1987, p. 88) very useful. The formula in cell G19 contains an error, though. While the AppleWorks 2.0 @ROUND function finds the quotient to the nearest whole as expected, the formula used with the @INT function doesn't round, but returns the greatest integer less than or equal to the argument. To provide the quotient to the nearest whole number, use the following formula in cell G19:

@IF(@INT(10*(C17/E17 + .5)/10) = G17,G17,0)

If the answer you want is the whole-number part of the quotient, then the formula in cell G19 is correct. The @ROUND function shouldn't be used.

**Carol Combs**
**4550 Peeples Road**
**Oak Ridge, NC 27310**

## DATA STRIPS

Because of limited space, we couldn't print data strips to accompany the program listings in our May and June issues. If you have reader hardware, please write or call *inCider*'s editorial offices (80 Elm Street, Peterborough, NH 03458, 603-924-9471) to request your free copy of these strips.

*We reserve the right to edit letters for clarity, style, and space. Please address your correspondence to Letters,* inCider, *Elm Street, Peterborough, NH 03458.*

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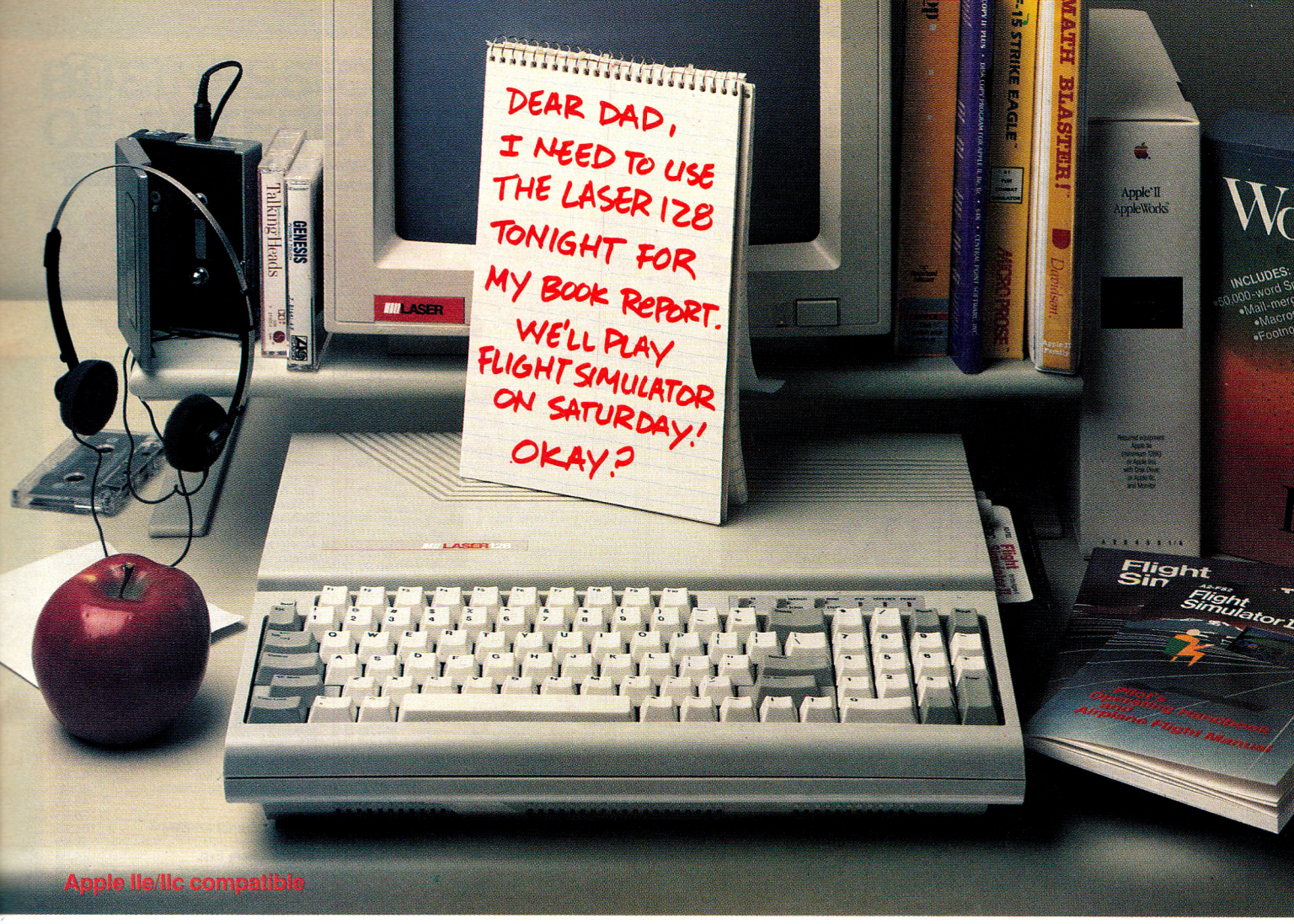


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## LASER 128

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# NEWS LINE

by *inCider* staff

## APPLE II FOREVER, AGAIN

New Apple II products from Apple Computer, Applied Engineering, and other hardware and software vendors will be on display at AppleFest, an Apple II-only show to be held in San Francisco September 18, 19, and 20.

Apple Executive Vice President Del Yocam and Apple II developer Steve Wozniak will be keynote speakers at the conference, which returns after a four-year absence, says Roy Einreinhofer, senior vice president of Cambridge Marketing Inc., the show coordinator.

Apple will showcase the IIGS as well as another new product, Einreinhofer said in late April, though he wasn't at liberty to disclose details of the new Apple device, other than to say it was a peripheral or enhancement. (A SCSI-standard LaserWriter or scanner is rumored.) Applied Engineering is expected to show its "Little Blue" add-in MS-DOS board for the Apple II, and vendors are expected to show new GS software products, according to Einreinhofer.

About 125 exhibitors are expected to attend the show in San Francisco's Civic Auditorium. If all goes well, there will be two AppleFests in 1988: in Boston in May and again in San Francisco in October.

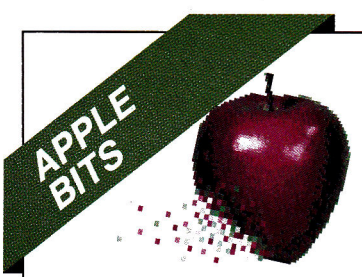
Boston Computer Society president Jonathan Rotenberg started AppleFest as a user show in 1981. It was sponsored by a number of different organizations as a user show until 1983, when support for the Apple II waned. It began this year as a small show to accompany the Apple Computer Clubs International programming-competition awards ceremony in Washington, D.C. But enthusiasm for the show grew and it turned into a full-blown Apple II computer show, Einreinhofer says. **—D. de P.**

## A MONTH FOR LEARNING

October 1987 is the first annual Computer Learning Month (CLM)—31 days of contests and activities designed to increase the public's awareness of computers and software for education in schools and at home.

"What's important about computer learning," says Ken Wasch, executive director of the Software Publishers Association, one of the sponsors of CLM, "isn't mastery of technology by whiz kids and hackers, but how millions of ordinary kids are using computers to develop critical-thinking abilities, academic skills, and creativity." CLM will emphasize the value of computers as tools for learning and creativity at home or in school, and educate parents and teachers on how to use them effectively.

Kathleen Hurley, vice president of Mindscape's educational division, another CLM sponsor, says a special booklet published for parents will convince many skeptical adults of the edu-




■Orange Micro (Anaheim, CA) has rewritten the software for its **ProGrappler IIGS** to include a universal printer interface. It seems that the most popular application programs, such as AppleWorks, don't support the old ProGrappler interface. Orange Micro is negotiating with Apple to put the new ProGrappler interface on the (already crowded) System Disk.

■There wasn't any entertainment software that took advantage of MDIdeas' (Foster City, CA) **SuperSonic** stereo card for the GS, so President Will Low put his other company, PBI Software, on the trail and found a "graphics/text adventure with super sound." Sounds like fun.

■StoneEdge Technology (Maple Glen, PA) has regrouped and re-released an old favorite, **DB Master for the Apple II**. President Barney Stone is particularly proud of the ProDOS database's reporting power, and is "working slowly" on a GS version. DB Master reads AppleWorks database files.

■Spinnaker Software (Cambridge, MA) has 19 people working on a single project: **Sargon IV**. The latest version of the popular chess tutor/game is so big it requires a compact disc to hold it all; Spinnaker is working with Phillips Electronics' consumer CD division, American Interactive Media, in Los Angeles.

■Look for a GS version of **ASCII Express**, the high-powered standard in Apple II telecommunications, as well as a new version of **MouseTalk**. The publisher, United Software (Canoga Park, CA), is seriously considering incorporating Gary Little's Binary II standard into its newest products.

■A new **Finder** for the Apple IIGS should be ready this year and will probably replace both the Program Launcher and the Apple Desktop with a fast manager and application loader. Apple may even move some of the system software off the disk and put it into the machine's ROM (read-only memory) at that time.

■The wholesale price of those **256K DRAM chips**—the ones that expand your Apple II's memory—has fallen below $20 apiece. Your cost? Around $50. Tariffs against Japanese imports were pushing up prices in April.

cational value of computers. She also observes that it's important to get communities involved and give parents and teachers ideas and activities for computer use. "By involving libraries and community centers," Hurley says, "you won't have to own a computer to participate."

Computer Learning Month includes scheduled contests for students in computer-generated art, noncomputer art (but computer-related), and essay writing. CLM's exhibition of contest entries will be the largest show ever of student computer work. A selection of student artwork and writing will be included in a CLM time capsule to be opened in the year 2001, as a reminder of the "state of the art" in educational computing in 1987. Teachers can also compete—in a contest of innovative applications of computers in learning.

If you're interested in entering any of the CLM contests, contact Computer Learning Month, P.O. Box 19763, Washington, DC 20036. The deadline for contest entries is October 22nd. **—L.L.**

## GS UPDATE

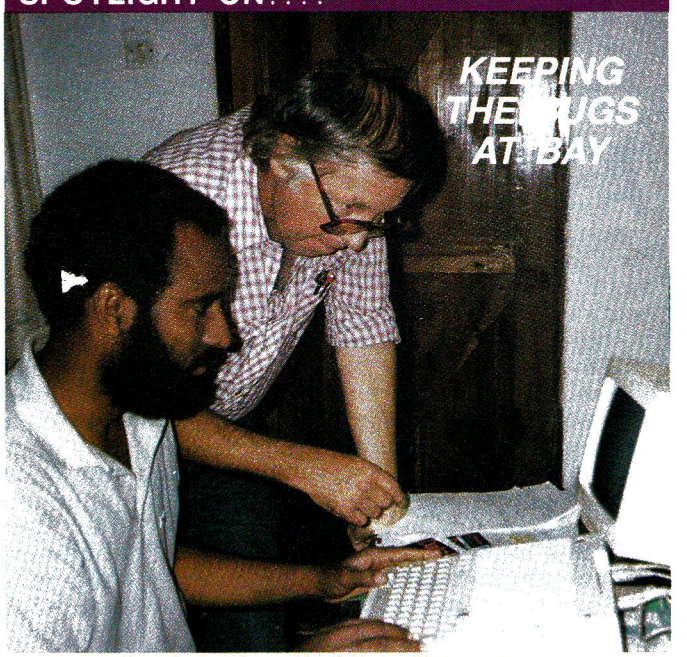
The Apple IIGS is suffering a few growing pains. The biggest problem for Apple's baby is its video-graphics chip: It's been a headache from the start, delaying the introduction of the GS in the first place.

"We still have a couple of cosmetic problems," reported GS Product Manager Tom Virden in April. The "barely noticeable" defects to which he referred are the "pinkish hue" of double-hi-res graphics and a slight flicker in text mode. The two are actually part of the same problem, says Virden, a problem that Apple solved in machines shipped after January 1987. At press time, Virden said new chips for older machines would become available in late summer.

If you bought a GS last year, you need new video chips. Virden admits "we haven't officially notified every dealer," so don't be surprised if yours tells you that the trouble's in your eyes, not your computer.

Virden says it's true that the "relatively low yields" involved in manufacturing a single chip for a single computer made it more attractive for Apple to make chips for the new Macs. But Apple is committed to upgraded chips for the GS. **—P.S.**

## SPOTLIGHT ON. . . .




**In Somalia, the Apple IIc and AppleWorks are "ideal tools" for Somali agricultural researchers struggling to learn English, according to entomologist Bob Lavigne.**

**At his research station in Baidoa, Somalia, Lavigne is studying dry-land crop agriculture as part of the University of Wyoming's Bay Region Agricultural Development Project. With the help of an Apple IIc he analyzes data and prepares reports. For a presentation last August at the International Tropical Entomology Conference in Nairobi, Kenya, Lavigne used his IIc and Spectral Graphics' AlphaChart to create graphs and posters illustrating his work.**

**Lavigne has also trained a number of Somali researchers on the IIc. Abdi Ahmed Mohammed, Soil Moisture Studies Research Officer at Lavigne's station, is the first of the Somali scientists to become proficient on the Apple.**

## GET IT WHILE IT LASTS—2.0 UPGRADE

If you haven't done it yet, you have until August 1 to file the necessary documents to get the $50 AppleWorks 2.0 upgrade from Apple Computer Inc.

Because of its popularity, Apple extended the upgrade program from the end of April to August 1; at press time, further extensions were possible, according to Elizabeth Gebhardt, AppleWorks product manager.

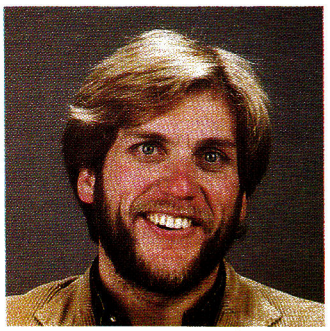
Apple has already received more than 10,000 orders for the upgrade, Gebhardt reports. The heavy volume is slowing the order process; don't expect to receive your copy of 2.0 for at least six to eight weeks, she says.

To order the upgrade, send Apple a product-warranty card (you can get that directly from Apple or from your local Apple dealer), the cover from your *AppleWorks Reference Manual*, your original AppleWorks program master disk, and a check for $50. **—D. de P.**

*We're always looking for news of the Apple world. If you're making news, send your press releases and photographs to News Line,* inCider, *Elm Street, Peterborough, NH 03458.*

# Inventing the Future

by Paul Statt, Technical Editor



*"People who could only read never started a revolution; people who can write make changes."*

Alan Kay is an Apple Fellow, a "futurologist" who draws a hefty salary for sitting around Apple Computer and contemplating the future. My prognostications pay less, but my opinion's the same as his: "The best way to predict the future is to invent it."

Apple's official line is that all of us—you, me, and Apple—are inventing the future: "We are Apple; we are the future; we are the revolution." Apple plays that song, loudly, on state-of-the-art hi-fi at company pep rallies. Apple Vice President and resident philosopher Jean-Louis Gassée has written a book, *The Third Apple*, in which he argues that Apple's personal computer has changed the world as much as Eve's apple or the one that bounced off Isaac Newton's head.

That assessment may be premature. Computers have not yet changed the way most people think, not the way the personal printed book changed the nature of narrative or the personal automobile altered our perception of space and time: Too many of the millions who buy Apple computers use them as they do the TV or toaster—to do a single job, such as typing or filing, or to entertain the kids. The computer revolution is only beginning, but it could stop as quickly as it started if people don't learn to *program*.

Do you have to learn BASIC or assembly language? No, you can program already if you know how to write a spreadsheet formula or AppleWorks macro commands. Playing with programming—of any kind—can't hurt, and it might be more fun than you think. You can learn BASIC for baseball fans, make your Apple sing with your own music software, draw pictures, forecast the weather. You can also *buy* software to do the same things, but you won't learn as much about the process underlying each task as you would by writing a program to do it.

Programming a spreadsheet to calculate possible mortgage payments, for instance, forces you to consider the way your bank calculates a loan. It forces you to understand something of finance. If you were then to write a spreadsheet that would advise you when to buy a new bicycle, say—taking into account the cost of the new one, the age of the old one, the cost of new tires, wheels, and pedals for the old one, and so on—you'd need to give serious, *rational* thought to how you make a buying decision like that. Programming makes you a little smarter, just as learning the logic of Latin or chess improves your "thinking skills."

People who could only read never started a revolution; people who can write make changes. The computer revolution won't begin until masses of people can write for their computers, whether they write assembly-language weather forecasters, BASIC music software, or spreadsheets for playing the ponies.

Even today, radical computer scientists are playing with ultra-high-level programming languages that will make it as easy to write a computer program as it is to give someone directions. More of us will become programmers, but it's the programming languages that will learn to be more like us. We won't even have to learn a new language if computers can learn to understand the kind of language we already speak.

And the people who program will invent the future of computing, speed the progress of the computer revolution, and push computers and their influence—rational thought—into more and more areas of our lives.

That's my prediction for the future: a world in which you think a little more like your computer and your computer thinks a bit more like you. You have a machine right now with which you can invent your future—but you have to start by understanding the way your Apple thinks, by learning to program. ■

# Æ Update . . .

The fastest IIGS memory product on the market is now available with Applied Engineering's GS-RAM and GS-RAM Plus memory cards. AE's GS-RAM and GS-RAM Plus now include a new disk caching feature which can be used independently or with the Apple IIGS RAMdisk. (Although a RAMdisk is faster, disk caching is easier to use.) Caching significantly improves Apple Disk 3.5 access time. The new caching technique uses highly efficient and optimized machine language programs providing ultra fast, state-of-the-art dynamic disk caching in both ProDOS 8 and ProDOS 16 environments. This new enhancement makes GS-RAM and GS-RAM Plus the fastest IIGS memory cards on the market today. Ultra fast disk caching is now included with all GS-RAM and GS-RAM Plus purchases. Current GS-RAM users can obtain an upgrade for $10.

Applied Engineering's DataLink modem is now ready to order with delivery in 2-3 weeks. DataLink is the newest and most advanced internal 1200/300 baud modem available today. DataLink incorporates the latest "modem on a chip" technology. Some of the components are so advanced they did not exist only one year ago. Because slot 2 is the normal location for a modem, Applied Engineering made an extra effort to make DataLink the only internal modem small enough to fit in slot 2 without interfering with the Apple IIGS's built-in fan. DataLink works in the Apple IIe and II+ as well. DataLink includes powerful communications software both in EPROM and on disk. This state-of-the-art modem has a retail price of only $219 and is covered by a 5 year warranty.

New video digitizer is in the final stages of development. Unlike older techniques, Applied Engineering's video digitizer incorporates its own high speed memory which solves many of the problems that the current DMA dependent video digitizers inherently have. Whereas other video digitizers are IIGS only, this new process will allow the Applied Engineering card to also work in an Apple IIe and II+ as well as the IIGS. Video digitizers on the market at present require many video frames in order to digitize a picture. This results in a digitized image that shows tearing or distortion if there is motion when the image is digitized. Applied Engineering's design is capable of digitizing a complete color or black-and-white image in a single frame, thereby eliminating distortion. Because the design incorporates three separate "flash analog-to-digital converters" it can actually digitize to a greater resolution than the Apple is capable of displaying on screen. However, the high resolution image can be reproduced on most printers and the video image is displayed to the maximum resolution on the Apple's monitor. The product should be available in September. A price has not been set but is expected to be in the $250 range.

Nonvolatile GS memory board soon to be released by Applied Engineering. The new card can piggyback to the GS-RAM and GS-RAM Plus cards or be used independently and uses standard dynamic RAM chips. It is available in 1 megabyte and 2 megabyte sizes. The memory on the board can be used as system memory or partitioned as a ROMdisk in 128K increments. If a RamCharger battery back up unit is connected, the memory is non-volatile. There are other techniques for creating non-volatile memory in the Apple IIGS memory expansion slot. One is the use of EPROMS. The engineers at Applied rejected this approach because of the difficulty in programming and reprogramming whenever customers wanted to update their software. The difficulty in programming and changing EPROMs combined with their relatively small memory capacities meant this approach was not acceptable. Another technique is to use SRAMs (Static RAMs) or EEPROMs (Electrically Erasable PROMs). These memory devices are easily programmed by the user but present the disadvantages of relatively small capacity and high cost. AE's solution uses 1 megabyte DRAMs with a battery backed-up refresh circuit. This allows the currently available RamCharger battery back-up unit to be plugged directly into the new expander to give permanent non-volatile storage. The card can also be used without the RamCharger as additional memory expansion. AE's solution has the advantages of large capacity and low cost.

Applied Engineering's new MS-DOS card (code named "Little Blue") is proceeding as planned. AE expects to be shipping product in October or November. Testing indicates that the product will be compatible with approximately 98% of IBM software; all major MS-DOS software is compatible. The card is expected to retail for approximately $500.

Applied Engineering is seeking an experienced 6502 machine language programmer to develop software and firmware for its future line of Apple peripherals. Minimum 2 years Apple programming experience required. Send your resume to Applied Engineering, P.O. Box 798, Carrollton, TX 75006 Attn: Personnel.

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# APPLE CLINIC

by Paul Statt, Technical Editor

*Apple Clinic is a forum for discussing Apple II hardware, software, and related subjects. If you have questions or answers, or want to make a statement, write to Apple Clinic,* inCider, *Elm Street, Peterborough, NH 03458.*

## Text-File Arrays

I have a IIc; I've been trying without success to create arrays in text files. Is this possible, or am I trying in vain? When I used the standard OPEN and CLOSE routines in ProDOS BASIC, I got an error message every time. Can you write arrays in text files?

**Ben Reis**
**Brookline, MA**

*An* array *is simply a list of numbers. It has a certain size, or* dimension, *you set in BASIC with a DIM command.*

*It's pretty easy to create an array in a text file. You're on the right track with the OPEN and CLOSE commands, but you may have forgotten READ and WRITE. Refer to* **Listing 1***: Specifically, you need to use the WRITE command (line 63) after OPENing the file (line 62).*

*The short program in* **Listing 1** *creates a neat list of numbers in a file of type TXT. It's a good way to store an array. You'll need to edit the program to make it do anything interesting; for instance, you'll probably want to* read *the numbers in the array from the text file at some point. The code to do that is a little more complicated. I recommend that you take a look at* BASIC Programming with ProDOS, *published by Apple Computer and Addison-Wesley (6 Jacob Way, Reading, MA 01867). You could also make your input (lines 11, 40, and 41 in* **Listing 1***) more interesting than a simple list of items.*

***Listing 1.*** *BASIC program creating text-file array.*

```
10  D$ = CHR$(4)
11  INPUT "HOW MANY ITEMS? ";N
12  N = N - 1
20  DIM A$(N)
30  FOR I = 0 TO N
40  PRINT "WHAT IS ITEM NUMBER "I + 1"?"
41  INPUT A$(I)
60  NEXT I
62  PRINT D$;"OPEN /A/B"
63  PRINT D$;"WRITE /A/B"
70  FOR I = 0 TO N
80  PRINT A$(I)
90  NEXT I
91  PRINT D$;"CLOSE /A/B"
```

## GS Clock

I have a new Apple IIGS with built-in date and clock card. How can I print the date and time before and after every session with the computer? Apparently you can do this from AppleWorks and other application programs, but I need to print the time and date before starting. It just doesn't seem right to pencil the time and date on each document.

**G.A. Spangler**
**Arlington, NE**

*No, it doesn't seem right to me, either.*

*The GS comes with a type of ProDOS clock (see "ProDOS Clocks," June 1987, p. 58) built in. To access it from BASIC, you must use ProDOS 8, the version of ProDOS designed for the GS. ProDOS 16, the 16-bit edition of the operating system, doesn't recognize the version of BASIC in your GS.*

*The shortest program I can imagine to get the time and date from the memory locations in which ProDOS stores them, convert them to English, and send them to the printer, is shown in* **Listing 2***. Type it in and save it as STARTUP.*

*I strongly recommend a large-capacity storage device. If you have a 3½-inch disk drive, you can add a final line to STARTUP:*

```
60  PRINT CHR$(4); "RUN
    /APPLEWORKS.SYSTEM"
```

*Now copy these files to your 3½-inch disk in the following order: PRODOS, BASIC.SYSTEM, STARTUP, APPLEWORKS.SYSTEM, and all the rest of your AppleWorks files. BASIC.SYSTEM discovers the file called STARTUP and runs it. The STARTUP program wakes up the printer—assuming it's in slot 1 and you remembered to turn it on—then prints the time and date, puts the printer to sleep, and loads AppleWorks. This technique works as long as you don't mind loading BASIC.SYSTEM before you load your application.*

## Typing Too Fast?

I don't consider myself a quick typist, but I do get the word *the* down pretty fast. When I type *the* quickly on the IIe, the machine often inserts the letter *j*: *thje*. At first I thought I was just making an error, inadvertently hitting the *j* key, until a student pointed out that his IIc does the same thing at home. Why does this happen and why doesn't Apple fix the problem?

**Dan Royer**
**Topeka, KS**

*Fix it? It's my only chance to type like a rocket.*

*Seriously, the problem is in your computer—the way the keyboard is wired. It's a grid that looks something like the accompanying* **Figure***. This electronic grid isn't exactly like the keyboard layout; that's why pressing* q *and* w *together doesn't necessarily yield an* e*. Press any three corners of a rectangle in the grid and your Apple will type the fourth for you. Try it.*

*I'd like to say that Apple fixed the problem in the GS keyboard. I checked, and typing* the *quickly*

***Listing 2.*** *This STARTUP program retrieves the time and date from the GS ProDOS clock and prints them.*

```
10  DY = PEEK (49040) - INT ( PEEK (49040) / 32) * 32
20  YR = INT ( PEEK (49041) / 2)
30  MO = ( PEEK (49041) - YR * 2) * 8 + INT ( PEEK (49040) / 32)
40  PRINT "TODAY IS "MO"-"DY"-"YR
50  PRINT "THE TIME IS " PEEK (49043)":" PEEK (49042)
```

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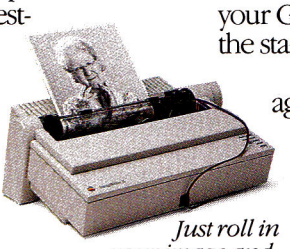

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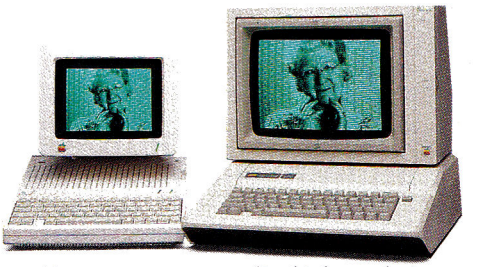

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*Figure. Grid showing IIe/IIc-keyboard wiring.*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| esc | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| tab | Q | W | E | R | T | Y | U | I | O |
| A | D | S | H | F | J | G | K | ; | L |
| Z | X | C | V | B | M | N | , | . | / |
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*doesn't result in* thje. *I understand that although the GS grid is different, it has its own quirks—they're just undiscovered. But at least* the *works.*

## Power On

For business purposes, I need to keep my Apple IIc on for prolonged periods of time. Is it safe to keep the power on for, say, 15 days at a time?

**Hugh Tamassaia**
**Timonium, MD**

*The* inCider *bulletin-board system (603-924-9801) runs on an Apple IIe that was turned on more than a year ago and hasn't been turned off yet, except for power failures and a rare "cold boot." A microcomputer consumes only a small amount of power; our BBS has had lots of problems, but none could be blamed on overheating.*

*If you want to run your IIc for a month at a time, I recommend only that you keep it well ventilated. A fan isn't necessary, but a breeze wouldn't hurt. You may find, as we have with the* inCider *BBS, that your system needs an uninterruptible power source (UPS) to weather hurricanes, blizzards, and so on.*


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## Clinic's Not Enough

Apple Clinic is very helpful, but I need someone who can give me direct answers by mail or phone for a fee. Most computer stores help with questions on their particular products, but don't always know how something will work with my Apple.

**Gifford W. Miller**
**Orange, CA**

*Tom Weishaar, editor and publisher of* Open-Apple *(P.O. Box 7651, Overland Park, KS 66207, $24/12 issues) says he or his associate Dennis Doms answers "80–90 percent" of the letters they get from subscribers, either by mail or in the magazine. Tom, like me, is reluctant to say he'll answer every letter, but he'll surely try.*

Call A.P.P.L.E. *(290 S.W. 43rd Street, Renton, WA 98055, $21/year) doesn't answer any more readers' questions than* inCider *does, but it publishes an extensive list of experts. It pays to become a member of the Apple Puget Sound Program Library Exchange ($26/year, including the magazine).*

*Don Lancaster has been incredibly helpful to me with Apple Writer and LaserWriter questions. His number in Arizona is (602) 428-4073.*

## Bold Move

I publish a small newsletter with Springboard's Newsroom. After printing my original, we duplicate it on a Xerox copier. Even with a new ribbon in my ImageWriter II printer, the original isn't bold enough to produce a good copy.

Springboard's technical-support people tell me there's no way to make The Newsroom print boldface. Do you have any suggestions?

**Paula Heilig**
**Kingsport, TN**

*The first thing to do is make sure your ImageWriter II is set to highest quality. The ImageWriter II has two lights marked Print Quality. If only the left light is on, the printer is in draft mode; only the right means standard quality. Both lights burn when you're printing in near-letter-quality mode, as you should be for your newsletter.*

*Evidently The Newsroom doesn't support printer-control codes; that is, you can't send the codes CHR$(27) and CHR$(33)—which stand for ESCAPE-! and turn on boldface—to your printer from The Newsroom.*■

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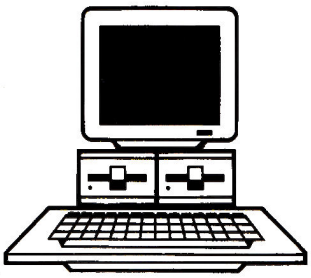

# GOLEM COMPUTERS

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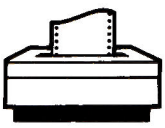

## SOFTWARE - HARDWARE - PERIPHERALS AT DISCOUNT PRICES

## SOFTWARE

### ENTERTAINMENT

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| Flight Night, Law of the West | ea. 18.50 |
| **ACTIVISION** Alter Ego (Male or Female) | ea. 29.15 |
| Hacker, Hacker II, Shanghai | ea. 23.40 |
| Championship Baseball or Football | ea. 23.40 |
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| Championship Lode Runner, Karateka | ea. 20.50 |
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| Moebius, Ultima IV | ea. 40.15 |
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| Championship Wrestling, Destroyer | ea. 23.40 |
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| F-15 Strike Eagle | 20.75 |
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| **SIMON & SCHUSTER** Star Trek I, II | ea. 23.40 |
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| **DESIGNWARE** Spellicopter, Math Maze | ea. 21.00 |
| Grammar Examiner, Mission Algebra | 23.40 |
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| Mathtalk, First Shapes, Kidtalk | ea. 25.90 |
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| **SIMON & SCHUSTER** Typing Tutor III | 29.15 |
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| Gertrude's Secrets, Gertrude's Puzzles | ea. 26.40 |
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| **ARTSCI** Magic Window II or IIe | ea. 77.55 |
| Magic Offic System | 129.00 |
| Magic Window II extra (128K) | 103.70 |
| **BPI** General Accounting (DOS or PRO DOS) | ea. 129.00 |
| Payrole, AR, AP, (DOS or PRO DOS) | ea. 129.00 |
| Inventory Control (PRO DOS) | 129.00 |
| **BRODERBUND** Bank Street Writer Plus | 46.75 |
| **DAC SOFTWARE** DAC-Easy Accounting | 41.80 |
| **HUMAN EDGE** Sales-Management-Negotiation-Communication Edge | ea. 52.00 |
| **LIVING VIDEOTEX** Think Tank | 77.85 |
| **MEGAHAUS** Mega Works, Paper Works, Think Works | ea. 58.30 |
| **MICROPRO INTERNATIONAL** Wordstar | 181.25 |
| Wordstar Professional | 253.00 |
| **MICROSOFT** Multiplan (DOS) | 57.50 |
| Multiplan (CP/M) | 118.00 |
| **PBI** Visualizer IIGS or IIc/IIe | 51.45 |
| **PEACHTREE** Back to Basics Acct. Sys. | 126.25 |
| Invoicing, AP, GL, AR | ea. 61.60 |
| **PERFECT SOFTWARE** Perfect-Writer, Filer | ea. 81.20 |
| **PINPOINT** Pinpoint (IIe & IIc) | 53.60 |
| Spellchecker, Document Checker | ea. 35.75 |
| Infomerger (IIe & IIc) | 47.55 |
| **SENSIBLE SOFTWARE** Sensible Writer | 51.70 |
| Sensible Speller IV (DOS, PRO DOS) | ea. 64.60 |
| Sensible Grammar Checker | 51.70 |
| **SOFTWARE ARTS** TK Solver | 178.20 |
| **SOFTWARE PUBLISHING** PFS: Graph, Plan (128K PRO DOS) | ea. 68.75 |
| PFS: File & Report (Combo 128K PRO DOS) | 68.75 |
| PFS: Workmates (128K PRO DOS F/R/W/P) | 137.50 |
| PFS: Write w/Speller (128K PRO DOS) | 68.75 |
| **SPRINGBOARD** Publisher | 88.55 |
| **WORDPERFECT** Wordperfect (IIGS) | 83.60 |
| Wordperfect 1.1 w/Speller | 83.60 |

### HOME/PERSONAL

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| **ACTIVISION** Writer's Choice Elite (IIGS) | 58.30 |
| Paintworks Plus, Music Studio (IIGS) | ea. 46.75 |
| Writer's-Filler's-Planner's Choice | ea. 29.15 |
| **BAUDVILLE** 816/Paint (IIGS) | 39.10 |
| Prince w/Ribbons (C. Itoch or Epson) | ea. 41.55 |
| **BRODERBUND** The Print Shop, Fantavision (IIGS) | ea. 34.95 |
| The Print Shop | 29.15 |
| The Print Shop Library 1, 2, 3 | ea. 14.25 |
| **EPYX** Graphics Scrapbook 1, 2, 3 | ea. 15.00 |
| **FUNK SOFTWARE** Sideways | 41.00 |
| **HABA/ARRAY'S** Home Accountant | 43.75 |
| **INTUIT** Quicken | 28.60 |
| **MECA** Managing Your Money 2.0 | 88.55 |
| **MONOGRAM** Dollars & Sense 128K or 48K | ea. 69.85 |
| **PINPOINT** Microcookook, Took Kit | ea. 26.15 |
| Bon Appetit | 41.55 |
| **ROGER WAGNER** Printographer | 23.40 |
| The Write Choice | 37.95 |
| Mousewriter (IIc/IIe, IIGS) | 87.45 |
| **SIMON & SCHUSTER** Your Money Manager | 52.55 |
| **SPRINGBOARD** The Newsroom | 34.95 |
| Springboard Publisher | 76.20 |
| Clip Art Collection 1, 3 | ea. 17.00 |
| Clip Art Collection | 21.75 |
| Certificate Maker | 27.25 |

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|---|---|
| **BEAGLE BROS.** Apple Mechanic, Utility City, Diskquick, Frame Up | ea. 16.00 |
| Beagle Basic, Double Take, Fat Cat, Pro-Byter, Big U, Macroworks, Alpha Plot, Beagle Screens | ea. 18.50 |
| Triple Dump, D Code, Power Print, ExtraK | ea. 21.00 |
| **BORLAND** Turbo Pascal | 39.60 |
| **DIGITAL RESEARCH** DR Assembler | 123.30 |
| **MICROSOFT** Applesoft Compiler | 105.90 |
| Fortran Compiler | 60.00 |
| **ROGER WAGNER** Merlin (PRO DOS & DOS) | 58.30 |
| **TERRAPIN** Logo | 58.30 |
| **UNITED SOFTWARE** ASCII Experss (DOS & PRO DOS) | ea. 67.40 |

## HARDWARE

### COMPUTERS

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|---|---|
| **VIDEO TECHNOLOGY** | |
| Lases 128 | 374.90 |
| External Disk Drive | 103.55 |
| Laser Expansion Box (2 slots) | 38.50 |
| Parallel Printer Cable | 19.40 |

### MEMORY & INTERFACE

| | |
|---|---|
| **APPLIED ENGINEERING** | |
| Ram Factor 256K (II+, IIe, IIGS) | 180.00 |
| Ram Factor 512K (II+, IIe, IIGS) | 215.00 |
| Ram Factor 1 MB (II+, IIe, IIGS) | 282.00 |
| Ram Works III 256K (IIe) | 157.00 |
| Ram Works III 512K (IIe) | 200.00 |
| Ram Works III 1 MB (IIe) | 260.00 |
| GS-Ram 256K (IIGS) | 130.00 |
| GS-Ram 512K (IIGS) | 168.00 |
| GS-Ram 1 MB (IIGS) | 229.00 |
| Z-Ram Ultra 1 256K (IIc) | 152.00 |
| Z-Ram Ultra 2 512K + Clock (IIc) | 243.00 |
| Z-Ram Ultra 3 512K + Clock + Z-80 (IIc) | 285.00 |
| Trans Warp (II+, IIe) | 210.00 |
| Z-80c (II+, IIe, IIGS) | 110.00 |
| Z-80c (IIc) | 122.00 |
| Timemaster H.O (II+, IIe, IIGS) | 77.00 |
| Phasor (II+, IIe, IIGS) | 137.50 |
| **AST RESEARCH** | |
| Rampack Plus IIGS (256K exp. to 1 MB) | 95.70 |
| Visionplus Digitizer (IIGS) | 220.00 |
| SCSI Interface Card (IIGS) | 95.70 |
| Multi I/O (clock/calendar/2 ser) (IIe) | 115.50 |
| Megaramplus (256K exp. to 1 MB) (IIe) | 190.30 |
| Sprintdisk (512K exp. to 2 MB) (IIe) | 291.50 |
| **MICROTEK** Dumpling GX | 45.40 |
| Bam - 16mm Ram Card | 52.25 |
| **ORANGE MICRO** Hotlink (IIc) | 48.20 |
| Grapler C, (IIc) | 78.40 |
| Prograpler (IIe, IIGS) | 78.40 |
| Rampak (512K exp. to 4 MB) (IIGS) | 200.75 |
| **PRACTICAL PERIPHERALS** Graphicard | 54.50 |
| Seri-All | 82.00 |
| **STREET ELECTRONICS** Echo Plus | 113.60 |
| Businesscard Multifunction | 165.00 |

### MODEMS

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| **ANCHOR AUTOMATION** Signalman Express (1200 BPS) | 199.10 |
| Signalman Lightning (2400 BPS) | 309.00 |
| **HAYES** Smartmodem 300 w/Smartcom (IIc) | 162.80 |
| Micromodem IIe w/Smartcom | 136.40 |
| Micromodem II (300 BPS) | 234.40 |
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| **NOVATION** 212 Apple Cat II (1200 BPS) | 327.00 |
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| **COMPUTER ACCESSORIES** Power Director P22 | 68.75 |
| **CURTIS** Ruby (Surge Protector/Filter) | 49.50 |
| Ruby Plus (includes Phone/Modem Port) | 69.30 |
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| **KURTA** Apple IS/GS Tablet (IIGS) | 321.00 |
| **MOUSE SYSTEMS** A + Mouse | 74.80 |

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| MSP 15 (132 col., 160 cps, NLQ) | 388.00 |
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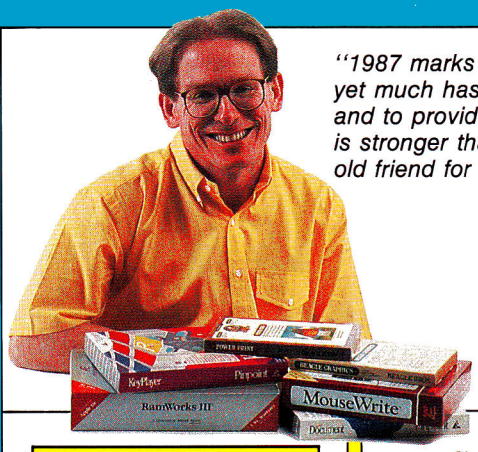


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| Laser GS (New) | CALL |
| Disk Drive 5¼" | 138.95 |
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| Disk Drive 3½" 800k w/Cont. | 278.95 |
| Expansion Box | 68.95 |

## PERIPHERALS

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|---|---|
| *Disks* 5¼" SS/DD 10 Pac's | |
| Maxell | 10.95 |
| Fuji | 10.95 |
| *Disks* 3½" DS/DD 10 Pac's | |
| Maxell | 23.95 |
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| I or II (Black) | 24.95 |
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| Scribe (Black) | 37.95 |
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| HR 15 & 35 (Black) | 30.95 |
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| FX, MSP 10" (Black) | 24.95 |
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| LQ 800 10" (Black) | 33.95 |
| LQ 1000 15" (Black) | 49.95 |
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| ML 82A, 92, 93 (Black) | 14.95 |
| ML 192, 193 (Black) | 33.95 |

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| | |
|---|---|
| *First Class* | |
| Sider 10mb System | 538.95 |
| Sider 20mb System | 618.95 |

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| | |
|---|---|
| *Apple* | |
| Mouse II E w/Int. | 118.95 |
| Mouse II C w/Cbl. | 88.95 |
| *Hayes Joysticks* | |
| Mach 3's IIE, IIC, IIGS | 34.95 |
| Mach 4's IIE, IIC | 59.95 |
| *Kraft* | |
| Premium 3 Button | 31.95 |
| Quick Stick | 48.95 |
| *Koala Tech* | |
| Koala Pad + w/Soft. | 78.95 |

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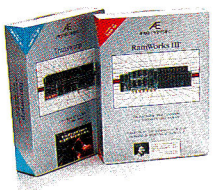
| | |
|---|---|
| *Applied Engineering* | |
| gs Ram | |
| w/512k | 168.95 |
| w/1mb | 238.95 |
| w/1.5mb | 288.95 |




| | |
|---|---|
| Ramfactor II+, IIE | |
| 512k | 224.95 |
| 1mb | 288.95 |
| Ramworks III IIE | |
| 256k | 164.95 |
| 512k | 198.95 |
| 1mb | 268.95 |
| ZRam Ultra I | |
| 512k | 194.95 |
| ZRam Ultra II | |
| 512k | 248.95 |
| 1mb | 298.95 |
| ZRam Ultra III | |
| 512k | 294.95 |
| 1mb | 348.95 |
| Transwarp | 229.95 |

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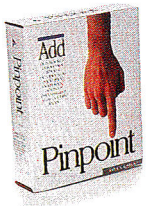
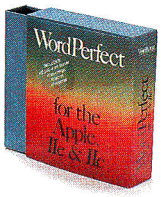
|---|---|
| *IIE* | |
| 320k | 158.95 |
| 320k & RGB | 188.95 |
| 576k | 188.95 |
| 576k & RGB | 218.95 |
| 832k & RGB | 248.95 |
| 1mb & RGB | 268.95 |
| *CX* | |
| 512k | 174.95 |

***Printer Interfaces***

| | |
|---|---|
| *Apple* | |
| Super Serial Card | 114.95 |

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| *Orange Micro* | |
| Grappler + w/16k | 118.95 |
| Grappler + w/64k | 139.95 |
| Grappler + RS232 | 74.95 |
| Grappler IIc | 78.95 |
| Hot Link IIC | 48.95 |
| ImageBuffer II w/64k | 68.95 |
| Prograppler GS, IIe | 74.95 |
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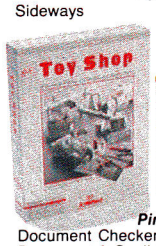

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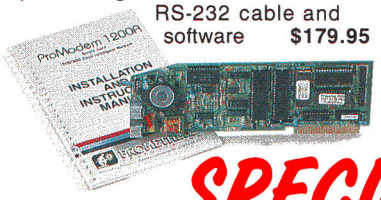


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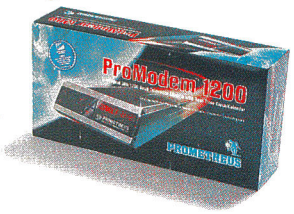


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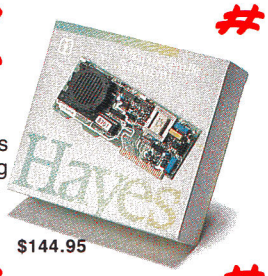


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# REVIEWS

Easy Working Writer, Planner, Filer; Graphics Tool Kit; Nine to Five; Time-Trax II; Games Editors Play

## Rock-Bottom Bargains

### EASY WORKING WRITER, PLANNER, FILER

*Spinnaker Software Corp.*, One Kendall Square, Cambridge, MA 02139, (617) 494-1200

Word processor, spreadsheet, and database; 128K Apple IIc, enhanced IIe, IIgs, ProDOS
$9.95 each
Rating: ■■■

Spinnaker's Easy Working series defies comparison. Placed next to almost any other software on the market, it looks bad: Are Easy Working Writer, Planner, and Filer powerful enough for serious word processing, spreadsheet, and database work? No. Are they friendly, first-time tools for beginners? Yes and no—easy to learn, but awkward to use. Is it fair to compare them to other programs at all? No. The Easy Working programs cost $9.95 apiece.

A price like that stops critics cold—productivity programs for less money than marked-down arcade games, the three functions of AppleWorks for less than 30 bucks. If you want decent programs with detailed documentation, you'll have to pay more. But if you want to teach a computing novice how a spreadsheet works or what "search and replace" means, or if you're just tantalized by the idea of software for busfare, the Easy Working series is hard to resist. The word processor even has a spelling checker, for heaven's sake.

#### CRAZY KEYS

The Easy Working boxes say "complete manual included," which is a fib—there's a pamphlet that folds up and fits into the disk envelope, combining Apple with IBM and Commodore instructions (for F3, read Open apple-3). Also, while the package boasts, "Best of all, this program is backed by Spinnaker Software Corporation," Spinnaker can't afford to do much backing at this price. You must send any questions along with a stamped, self-addressed envelope and $5.

Planner, Writer, and Filer share a command interface. Booting the program, or pressing the escape key from within a file, puts a command menu at the top of the screen. The left and right arrows move among choices such as "print," "storage," and "setup." The down arrow opens a vertical command submenu—in the storage menu, for example, saving or loading a file or formatting a data disk.

The setup options involve specifying a drive or ProDOS pathname for data files, entering your printer-slot, interface, and control codes (there are no supplied printer drivers), and saving setup information. While you can copy the programs, they kept going to my 5¼-inch disk (slot 6, drive 1) when I tried running them from a 3½-inch drive.

The menu is convenient, but Easy Working keyboard commands, while consistent across the three programs, are clumsy. It's nice that Open apple-3 always selects a block of text or cells and Open apple-4 brings a pop-up menu of commands for manipulating that block. But other commands are inexplicable. In the Writer, for instance, Open apple-7 and -8 make a nice side-by-side pair for moving the cursor to the end and beginning of a line—yes, the one on the left moves right and the one on the right moves left. I don't know what the programmers were thinking of.

#### NICE NUMBERS

Cheapness aside, I rather like Planner, a simple spreadsheet with a grid of 250 rows by 250 columns (though limits to memory and speed will stop you before that). You can set column widths only globally, though you can reformat either a whole worksheet or block of cells for dollar, percentage, integer, bar-chart, or decimal (one to four places) data.

You can also cut, copy, or paste a block to or from a memory clipboard or disk file, or insert or delete rows or columns. Planner is smart enough to know a label from a number as you

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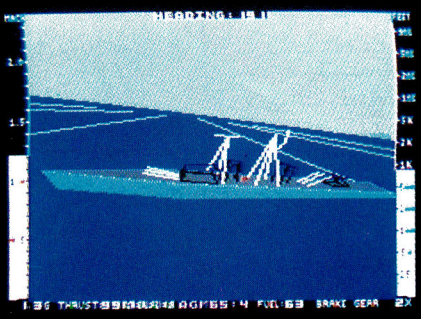

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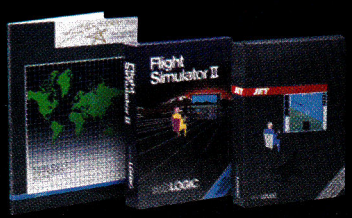


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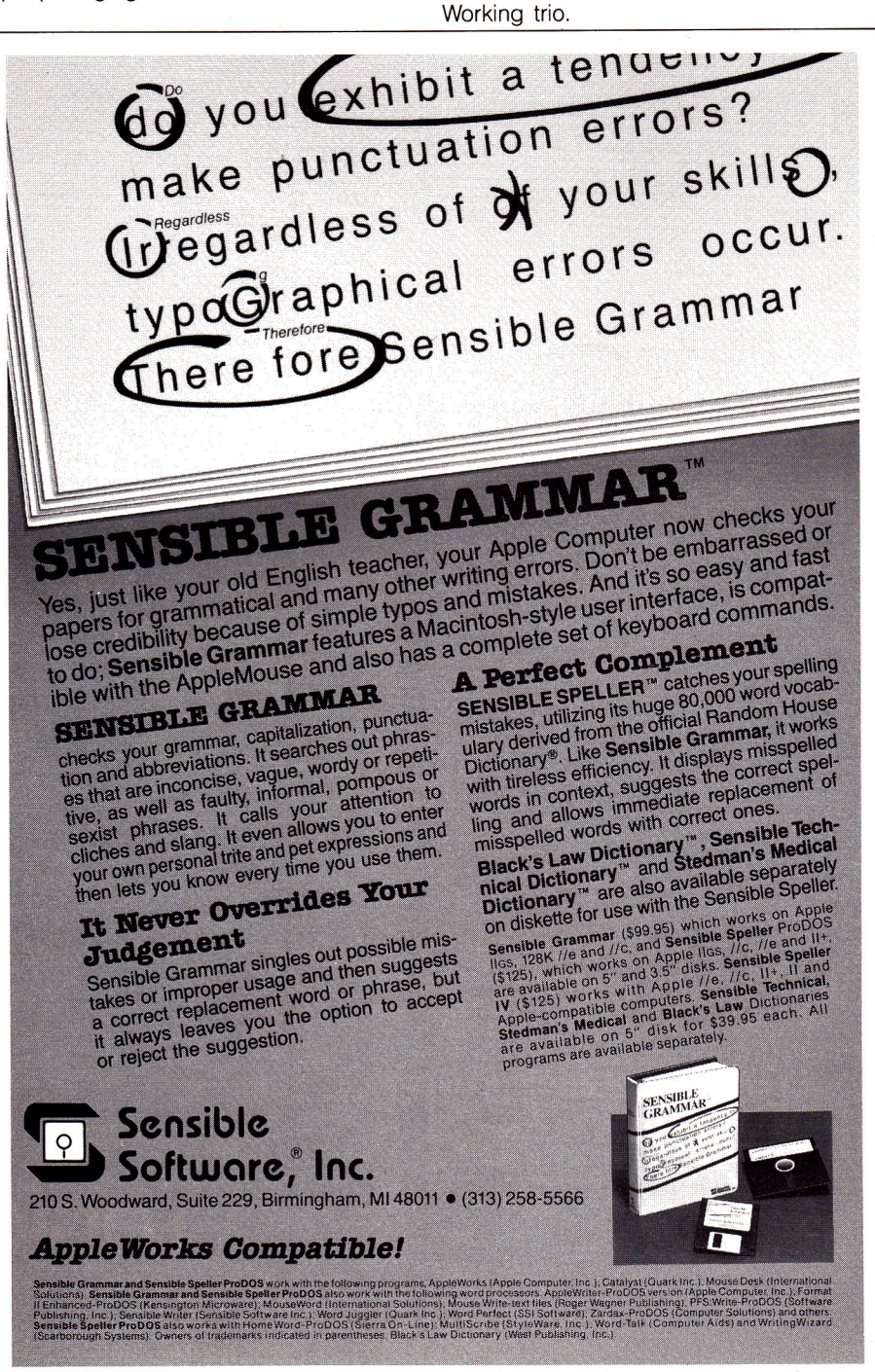
start typing, though you must preface formulas with an equals sign. There's no cell pointing for entering formulas without typing addresses, though adding dollar signs to coordinates changes relative cell references to absolute.

The Edit command is a little strange: Besides moving the cursor to the status line to let you edit a value or formula, it also lets you accidentally or intentionally alter a cell's address (copying it to a new location) or type (changing VALUE to BALUE and getting an error message). The Move command does the same thing, moving instead of copying a cell if you change its address.

Don't look for fancy financial or algebraic functions; as an introductory spreadsheet, Planner's vocabulary doesn't go much beyond ABS, SUM, AVG, MIN, and MAX. But if you want a beginners' worksheet fit for the kind of home-budget and gas-mileage jobs included in its six sample templates, Planner is the nicest of the Easy Working trio.




## SLOW SPELLING

I wish Writer came with some sample files; they could help show the use of its sometimes awkward formatting controls. If you just want to type a few pages with no fancy layouts, Writer will suffice, though in some ways it's the kind of introduction to word processing that might give beginners a bad impression.

Typing response grows sluggish after the first screenful or two, perhaps because Writer, like the other programs, has no overstrike cursor—you're always in insert mode, and must use the delete key to erase text ahead of the cursor. (Open apple-Delete is a backspace.) I tried a block delete, moving the cursor a few lines past the actual end of my text, and crashed the program.

Writer includes numerous cursor-movement commands, most using the awkward apple- and number-key combinations I mentioned earlier; while Open apple-F moved forward a word as it was supposed to, my review copy's Open apple-B jumped randomly through the file instead of backward a word. The manual also listed the cut and paste commands as Open apple- instead of Control-C and -P, a mistake Spinnaker says it has fixed in later printings.

The Writer is good at block operations—as with the Planner, Open apple-3 lets you select text and the Open apple-4 menu lets you cut, copy, or paste it to or from RAM or disk. The search and replace functions are equally competent, as is the preview feature, which shows margins, justification, spacing, and headers or footers on screen.

Getting such effects, however, requires wading through a pop-up print-control menu (called with Open apple-1) and sprinkling codes, which appear as capital I's, through your text—answering an option box for margin or tab settings, or giving the commands for boldface, underlining, or other highlighting. (It's a daunting chore for beginners to find the proper printer-control codes and enter them into the Writer's setup menu, though you have to do it only once.)

The process works, but is clumsy—rather like Writer's spelling checker, which flags items not found in its giant dictionary (everything from *iseult* to *ngultrum*), but does so by sorting your file, then reading the entire 107,000-word dictionary. When I

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checked a 500-word document on a 5¼-inch-disk system, the interval between giving the spell command and getting the first correct-or-accept prompt was a colossal 14 minutes of disk spinning (with a disk flip halfway through).

## LITTLE FIELDS

Filer is meant for the first-time database user, supporting up to ten fields per record. One field in each database must be the key field, on which the database is sorted automatically. Text can be flush left, flush right, or centered within its field length, and numbers can have zero to four decimal places.

Unfortunately, while the manual says the maximum field length is 60 characters on 80-column screens, it turns out that's only for MS-DOS. Calling Spinnaker about my rash of "field too large" messages, I learned that Apple owners, though the program requires an 80-column display, are stuck with the same 25-character fields as lowly Commodore 64s. First names or phone numbers will be fine, but some titles in your home-video database won't fit.

Past that, I had no trouble designing a database and entering records. Filer either reserves all free space on your data disk for a new database, showing you how many records will fit, or lets you specify a smaller number of records; I like that.

Retrieving and reviewing items, however, I found that Open apple-4, billed as the "find previous record" command, didn't work. Rather, it worked just like Open apple-3, the "next record" command (though Open apple-4 did move backward through help screens).

Otherwise, Filer's all right—not a fast retriever, but okay for minimal recordkeeping. When you want to find, delete, export, or print records from a database, a handy option box lets you enter a "from–to" range for the key field and equals, greater-than, or less-than criteria for others; there are limited wildcard searching abilities, too. For printing, a report-definition box lets you specify whether to print each field, whether to print the field name beside its data, and other layout questions, such as field order and number of records abreast.

## ALL TOGETHER NOW

Easy Working is no match for AppleWorks or the PFS series, but gets fair marks for integration. Filer and Planner talk to each other nicely, each exporting records or cells to disk in a format the other can import. Planner's "Print to File" option lets you save spreadsheet rows for pasting into a Writer document; it was the third thing I tried after failing with "Export Data" and "Copy to File." (Another strike for the skimpy documentation.)

A "merge mark" option on Writer's pop-up formatting menu lets you insert successive fields from records exported from a Filer database. Mail-merge printing works well, unless you want to put two merge items on the same line—the merge doesn't remove trailing spaces if an entry is shorter than the Filer field length, so you can send a letter to Mr. John (six spaces) Smith.

When I used Planner's "save DIF file" command, AppleWorks couldn't import the resulting worksheet. A Spinnaker representative told me a different DIF was on the way—that the feature, with other bugs I found,


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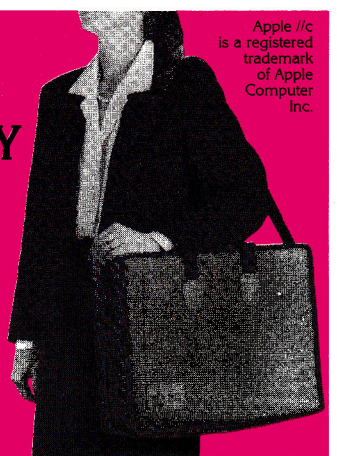

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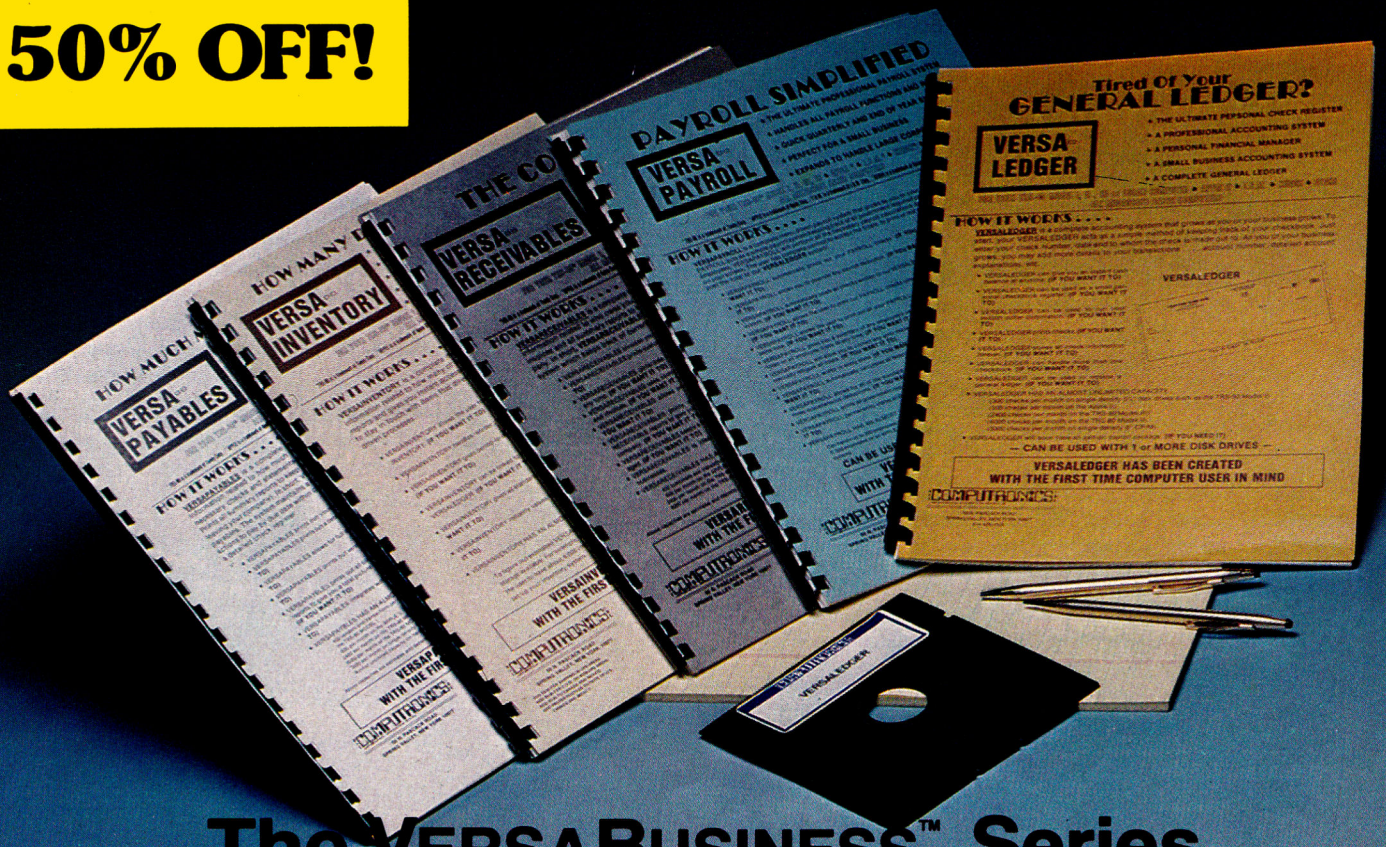


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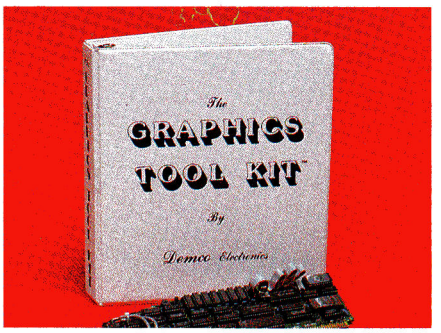
such as Writer's moving backward by word, would be fixed in later releases.

Meanwhile, I'm left with mixed impressions. Testing the Easy Working programs, I found myself thinking how nice they'd be with fewer bugs and smoother commands, even if it required a hike to $20 or so—which is precisely the wrong thing to think: It misses the programs' whole point. The Easy Working programs aren't very good, but they're good enough for beginners or the curious to spend some pocket money. This is the software-marketing ploy of the year. ■

*Eric Grevstad*
inCider *staff*




## Remarkable Resolution

### GRAPHICS TOOL KIT

*Demco Electronics*, 10516 Grevillea Avenue, Inglewood, CA 90304, (213) 677-0801

Video card with graphics software; Apple II Plus or IIe; AppleMouse and high-persistence monitor recommended
$395
Rating: ■■

If you're eager for professional-level graphics or desktop publishing, you might want to go beyond your Apple's hi-res or double-hi-res display. Demco's Graphics Tool Kit (GTK) is a monochrome graphics card for your Apple II that supplies much greater resolution than the standard circuitry—a sharp 640 horizontal by 768 vertical pixels, twice that of a Macintosh and triple the best of the IIGS' super-hi-res screens. Your video monitor serves as a window, showing half of this ultra-hi-res image at a time.

GTK's graphics are amazing, but, like all boards that enhance Apple graphics, it's incompatible with standard Apple graphics software. Therefore, except for do-it-yourself programmers (who'll appreciate what it does for Applesoft BASIC), Graphics Tool Kit is only as good as the software that drives it. Unfortunately, the supplied software is limited and awkward to use.

#### INSTALLATION

Graphics Tool Kit consists of a printed circuit board and four double-sided ProDOS disks. The board goes into any slot (except 3 if you're using the auxiliary slot on a IIe). It has three connectors: an AppleMouse port, an RCA jack running to your Apple's video-out port, and another RCA jack that connects to your monitor.

Once you hook up the hardware, you boot the GTK software and configure it to match your printer and interface card. You might check with Demco before buying to make sure GTK supports your setup, but the software works with most popular printers and interfaces. Installing and configuring the hardware and software is a breeze; you'll have the system up and running five minutes after opening the box.

#### THEORY AND PRACTICE

The idea behind the Graphics Tool Kit is simple and elegant: It lets you create and edit a complete page of graphics on your monitor at the same resolution as that provided by your printer. For the first time in Apple hardcopy graphics, what you see is truly what you get. GTK is designed to work with printers that produce 80 horizontal dots per inch (like the Apple ImageWriter); if your printer has greater resolution, the Tool Kit will compress its output to fit onto 8-inch-wide paper. There's also a near-letter-quality mode for printers that can handle 160 dots per inch.

The card supports four high-resolution graphics screens. If you program GTK yourself from Applesoft, you can switch among all four; if you use the supplied Graphics Editor software, you can access two of the screens. The Editor uses the memory in the other two to store program overlays.

Although the Tool Kit's resolution is 640 by 768 pixels, you can see only half of a graphics screen (342 pixels vertically) at a time. The software lets you choose among viewing the upper half of the screen, the middle two quarters, or the lower half. Functions

such as line drawing are continuous over all sections of the graphics screens.

One final note on the hardware: the GTK board uses interlacing to achieve its extraordinary 342-line vertical resolution. In a standard display, the video processor refreshes or redraws the pixels on your screen 60 times per second, fast enough to fool your eye into thinking the pixels are always on. When a computer isn't fast enough to process all the information it needs to create a display in one-sixtieth of a second, one remedy is *interlacing*. The video processor paints the even-numbered lines of pixels, offsets the display by half a line, then paints the odd lines.

This doubles the vertical resolution, but produces a noticeable flicker on a standard monitor, since individual pixels are refreshed only 30 times per second. Demco recommends you use a high-persistence monitor with the GTK system. I found, however, that a regular monitor works nearly as well if you tone down contrast and brightness.

You can write your own GTK programs in Applesoft BASIC. Demco provides modifications to Applesoft and a library of ampersand commands that make using the enhanced resolution of the board easy for BASIC programmers. Demco doesn't supply hardware addresses for assembly-language programming.

If you're not interested in programming the board, you can use the software provided with the system to create an entire printed page of graphics. You can make newsletters, circuit diagrams, architectural drawings, musical scores, and more. You can use multiple fonts and import standard Apple graphics into your GTK screens; cut and paste within a screen, between screens, and to and from clip-art disks; or even design your own fonts and shape tables. This is all wonderful—but the problem is you can't do any of it very easily.

## TRIPPED UP

I found the Graphics Editor, the heart of the GTK software, a chore to learn and use. I first tried the program without an AppleMouse: I used the keyboard to choose options and move the cursor. This process is slow and awkward; the system didn't recognize my IIe's cursor arrows, so I had to use eight other keys to move the cursor.

By contrast, the mouse interface is nothing to rave about, but it easily beats drawing with the keyboard. You can also use joysticks and drawing pads, but that involves further gyrations, since these peripherals are designed to work with Apple hi-res screens.

A more general problem with the Graphics Editor is its excessive number of modes. When you're creating or editing a graphics screen, you're in draw mode, which has a number of subsidiary modes, such as text entry and point plotting. The problem is that each of these modes has subsidiary modes of its own, too.

Let's say you're using keyboard control and want to add text to your graphics. You first enter text mode from a menu or by typing T from draw mode. Now you find yourself in cursor-positioning mode, in which you move the cursor to the place you want to enter text. Once there, you hit the return key for text-entry mode, in which the keyboard doesn't move the cursor but enters text, until you hit Return again to go back into cursor-positioning mode. Of course, if you hit Control-T while in text-entry mode, the return key acts as a standard carriage return; you must hit Control-T again before the return key will take you back to cursor-positioning mode.

Another fault of the Graphics Editor is its lack of graphics primitives. You can't draw a circle or oval, or create a box without drawing all four sides independently. The number of brushes available is also limited, although you can use shapes from shape tables as brushes. Also, the software is slow. You can easily type ahead and lose characters during text input; the fat-bits function takes a long time to initialize; the fill function takes forever to paint large areas.

Still, if you have a mouse and some patience, GTK includes plenty of software tools. Other components of the GTK package are a font editor, a shape editor, and a disk chock-full of fonts, shapes, clip art, pictures, and utility programs. Demco certainly gives you enough to work with, though I wish it were easier.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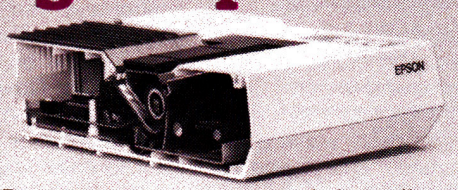

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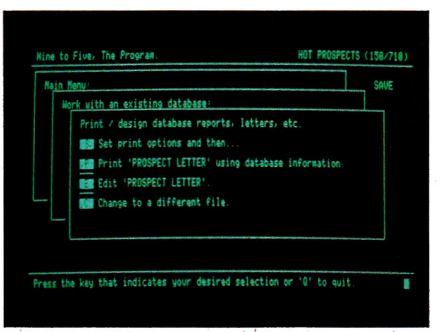
**THE PAYOFF**

Once finished with the Graphics Editor, you can save and print your creations. I had no problem printing with my ImageWriter and Super Serial Card; hardcopies of my graphics pages were uniformly excellent.

GTK is a good piece of hardware coupled to some not-so-good software—not that the software is buggy, but it's simply difficult to use. The Graphics Tool Kit is an intriguing programmer's package, but its complex software and high price keep it from fulfilling its potential for mass-market applications of the MousePaint, Newsroom, or Print Shop type.■

*Robert M. Ryan*
*Peterborough, NH*

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Rating: ■■■■

At the risk of being accused of heresy against AppleWorks, I'd like to say that Apple II owners have rarely had a truly powerful, yet easy-to-use, database manager and report generator. Now, however, there's Nine to Five—a program with enough muscle for business applications, yet simple enough for home users to track video collections or Little League statistics.

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## PLANNING AHEAD

The process of creating a Nine to Five database differs slightly from the corresponding process in AppleWorks or PFS:File: You must define the length of each data field and the type of information the field will hold (such as text, dates, or numbers), and create a label for the field.

It takes more forethought than other systems, but the time spent is worth it; Nine to Five uses these setup data to determine the maximum number of records a file can contain and to add flexibility to its report-generating capabilities. For example, it's easier to refer to a label than an elaborate formula. You can also assign a password to your new database, to keep your records safe from those who shouldn't see them.

Data entry and editing are where Nine to Five really starts to shine. The program uses the apple keys in conjunction with various other keys to simplify movement around the screen and data entry—Open apple-C, for example, clears a field, while Open apple-R restores an accidentally deleted entry.

The real time-saving commands are two shortcut keys: You can use Open apple-S any time to copy repetitive data from a field in a previous record, such as filling the "Category" field if the first ten movies in your video database are all Westerns. Open apple-N adds one to any whole-number field, incrementing each succeeding entry in a series of check numbers or other numerals.

Once you've used Nine to Five's Order option, you'll wonder how you ever did without it and why other programs don't have it. This feature lets you change the order of data entry among your fields. After choosing the option from one of Nine to Five's nested menus, you select fields in any order with a flashing cursor—rearranging the entire sequence, or choosing only selected items.

For example, if you need to enter or edit only the 12th, 15th, and 20th fields of your database and don't want to repeatedly press the return or arrow keys to get there, you can simply change the order, enter data in what are now the first three fields, and go on to the next record. You can make the new order permanent or erase it after use, thereby restoring the original order.

## GETTING DATA OUT

Only AppleWorks rivals Nine to Five's sorting and viewing abilities and flexible record-selection criteria. The program can sort data on up to three fields, retrieved with either exact matches or wildcard searches. You can select sorts with "In Range," "Out of Range," "If. . .Or," or other commands. Simple screen menus offset the thoroughness and complexity of the available sort options.

You can print database information in the form of letters, general text files, mailing labels, and reports. Reports can vary from highly structured rows and columns to simple excerpts within a letter or text file.

The difficulty of constructing a report depends on the report's level of sophistication. It can be as easy as designating headings and columns, the only two commands needed for a simple report, but Nine to Five is so powerful it'll also let you create a report crammed with embedded conditional commands, true/false tests, and convoluted calculations and subtotals.

*Continued on p. 86*


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# MAKING MUSIC

*You and your Apple can make beautiful music together. From affordable 8-bit programs to more sophisticated GS software to MIDI-compatible products, the sound of Apple II music is exciting, varied, and professional.*

by Margaret Gorts Morabito

You've probably read a lot about the sound capabilities of today's personal computers, but you've wondered whether your Apple II has an aptitude for music. You may be surprised to learn that your trusty II, with the right hardware and software, can perform just about any musical task you can imagine.

That's especially surprising when you realize that your unadorned Apple can generate only a click. Through programming, though, you can magnify and fine-tune that unimpressive click into melodious sounds that can handle the job of music education at home and in school.

With the addition of polyphonic-, stereo-sound cards, external amplifiers and speakers, and MIDI interfacing, your Apple can manage the requirements of more advanced music education as well as the needs of professional composers and performers. If you have a IIGS, you have an even wider range of musical options. (See the accompanying sidebar "The Sounds of GS Software.")

From Stickybear Music to MIDI (musical-instrument digital interface) products, manufacturers offer various genres of musical software and hardware—everything from affordable programs for home users and schools on tight budgets to more sophisticated Apple II products that are at home in professional recording studios.

## NONMIDI MUSIC FOR THE HOME

You'll find a great selection of programs that teach children the fundamentals of music, encourage composition, and provide hours of fun. Most of these self-instructional and entertainment programs sell for less than $50 and take advantage of the Apple II's limited built-in sound capabilities quite effectively; they don't provide harmonies or stereo, though.

**Stickybear Music**, from Weekly Reader, is a typical example of this type of music software. It's written for kids aged 7 and up, and teaches music notation and composition through the use of color, graphics, and sound. The package includes sample melodies to which children can listen while they watch corresponding staves of notes on screen. You can modify these songs or write your own by placing notes one by one on the musical staff.

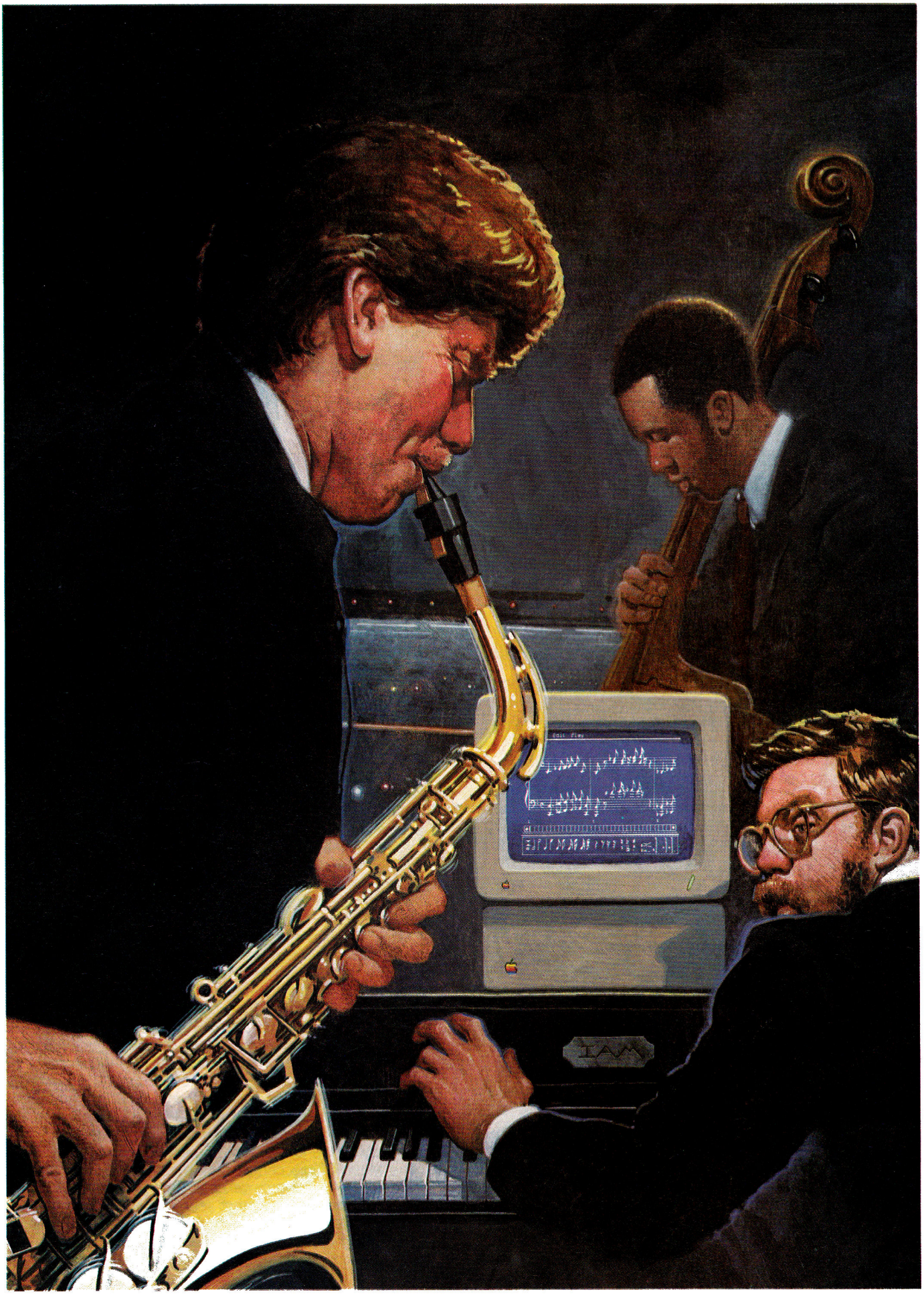
Children aged 3–6 can learn the principles of music and tune recognition through **Prokofiev's Peter and the Wolf Music**, from Spinnaker. This program includes six learning games that require children to discern similar and different tunes, recall tunes, and associate music with characters from the story.

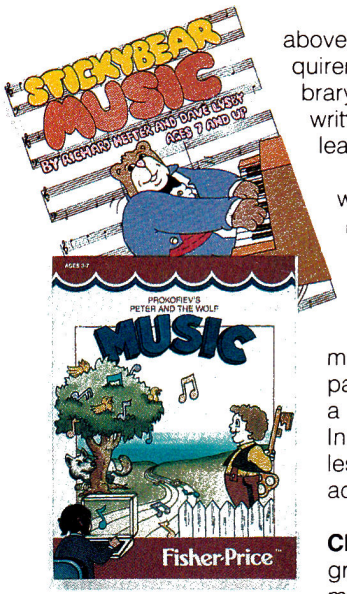
Great Wave Software recently released **KidsTime II** for the GS. It contains KidsNotes, a program that lets children compose simple melodies on the computer's keyboard while watching a piano keyboard on screen. The software places notes automatically on a musical staff as the child plays.

Programs such as Stickybear Music, Prokofiev's Peter and the Wolf Music, and KidsTime II function well as stand-alone learning and entertainment activities for youngsters breaking into music. Even children with no prior knowledge of music can use the software without parental supervision. The software provides a good introduction to names of notes, note and rest durations, and basic key and time signatures.

## NONMIDI SCHOOL INSTRUCTION

What about music teachers who need software for members of a school band or chorus, as well as general music students? While the types of programs mentioned






*Stickybear Music; Peter and the Wolf.*

above can fulfill some of these requirements, there's also an entire library of music-education software written especially for formal learning.

Music-education programs are written for all levels, from elementary school through college, and can handle some of the tasks music teachers encounter regularly, including student recordkeeping. Many manufacturers publish series of packages you can buy either as a set or as stand-alone programs. Individual programs typically cost less than $50 and don't require additional hardware.

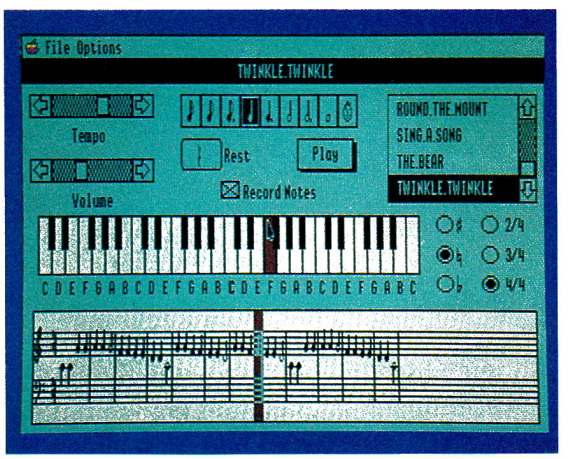
For example, Wenger's **Music Class Series** offers five programs that teach music fundamentals, rhythm, ear training, music symbols, and note reading. The program also keeps records for up to 125 students. Another line, Wenger's **Fingering Series**, offers ten programs that teach finger placement for the major woodwind (clarinet, saxophone, bassoon, oboe, flute) and brass (trumpet, French horn, trombone, baritone, tuba) band instruments. You can buy the woodwind or brass series for $99 each, or an individual program for $29.

**Aural Skills Trainer**, from Electronic Courseware, is a three-program series aimed at improving students' abilities to identify intervals, basic chords, and seventh chords. With **Basic Band Computer Tutor**, from Alfred Publishing, students can practice duets with the computer. The software includes learning segments and practice sessions for more than a dozen band instruments.

These are just a few of the music-education programs for students learning to play musical instruments or to sight read for choral or band participation. Software can't take the place of a good music teacher or hours of diligent practice, but it can certainly be a time-saver for busy music teachers and a boon to students practicing at home.

## SOUND CARDS

While a tremendous amount of music software uses the Apple II's stock hardware, these programs are basically limited to monophonic, one-voice sound. To produce harmonies and multiple voices, you need a sound card, MIDI system, or GS.




*KidsTime II lets children compose their own melodies.*

With a sound card and an Apple II, you can produce three- to six-part songs, sound effects, and speech through external stereo speakers. Cards such as the **Mockingboard**, **Echo Plus**, and **Phasor** cost less than $200 and are supported by commercial software companies.

Mindscape's **Bank Street Music Writer** and Electronic Arts' **Music Construction Set** use the Mockingboard and let you create, edit, and play back harmonies, and print piano sheet music. While Music Construction Set lets you play only two instrument sounds at a time, Bank Street Music Writer takes full advantage of the sound card and lets you use up to six different instrument sounds at once.

If you can program, you can use these cards for your own sound-development projects. For example, you can create musical backgrounds and catchy sound effects for your programs. Sound-card manufacturers often supply editing utilities specifically for this purpose: Applied Engi-

# The Sounds of GS Software

The first Apple IIGS music programs come from two big players in the music-software field: Activision's **Music Studio** and Electronic Arts' **Music Construction Set**. Both are compatible with MDIdeas' **Super-Sonic Stereo Card** and both support MIDI instruments.

## THE MUSIC STUDIO

The Music Studio provides lots of power for advanced music students or the serious composer. You can create 15-part harmonies of up to 15 different instruments at a time. The program is easy to use, with a depth that's hard to exhaust. Simply click the mouse on a menu or the grand staff to compose, edit, and play.

From a musical standpoint, The Music Studio is authentic. Key and time signatures and volume and tempo markings are displayed on screen at all times, providing valuable reinforcement for music students. A noticeable omission is preset measure bars.

Composing songs is particularly entertaining because you can hear the notes as you move the mouse along the staff. When you like what you hear, just click. Notes are color-coded to their instruments, which helps if you're playing along with the music or studying parts. The Music Studio lets you listen to an entire song or to specified measures with all or selected voices active. Notes scroll along as they're played, or you can opt for a static view of several measures as the entire song plays.

The program offers volume and tempo sliders, seven different time signatures and 15 key signatures from which to choose. You can add note ties and measure bars; select instruments; add or remove a dot from a note, an accent, or a triplet; select note durations (from whole to 32nd); add or remove rests; and add sharps, flats, or naturals.

Eight block functions let you insert, copy, and move sections; replace one instrument with another; lengthen and shorten note durations; transpose notes up and down one step; and repeat measures or an entire song.

The Music Studio comes with four built-in sound files, including an uncanny voice emulator that lets you compose and listen to music that sounds as if it's sung by an *a cappella* choir. There are 20 songs on disk, providing plenty of material for experimentation, but if you tire of playing, modifying, and printing them, the pro-

neering's Phasor comes with a set of editing programs, and Sweet Micro Systems' Mockingboard includes well-designed editing software (created by Electronic Realities) that lets programmers tap the best of that card.

Although sound cards add more parts, more instruments, and stereo output to your Apple, serious musicians—students, amateurs, or professionals—will probably want to take a look at MIDI sound production, which lets you compose more easily and is used for live performance.

## THE MAGIC OF MIDI

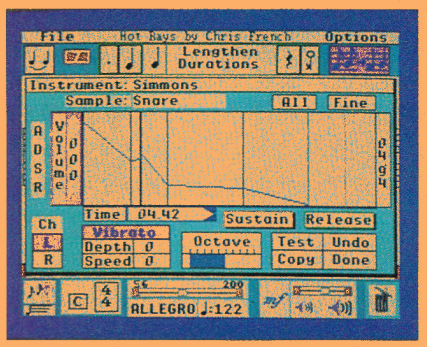
For top-of-the-line electronic music production, the musical-instrument digital-interface protocol has clearly established its supremacy. MIDI came on the scene a few years ago as a communications standard through which all electronic instruments and other musical tools could be connected, regardless of manufacturer. In simple terms, MIDI is a way to let musical apples speak with musical oranges.

The MIDI standard was soon applied to computers, so that they, too, could communicate with MIDI instruments and act as controllers. Apples were the first personal computers to use the MIDI interface; that explains why there's such a large library of MIDI software for the Apple II family.

A basic computerized MIDI system consists of a personal computer, MIDI instrument (such as a keyboard or guitar), and MIDI interface card. Interfaces come in various forms. For example, Passport Design markets an internal interface card that plugs into one of the Apple's peripheral slots. Roland manufactures similar internal interfaces, plus an interface card with external MIDI controller unit.

MIDI instruments are usually keyboards that look like

*Music Studio: Create 15-part harmonies with 15 instruments and your own sound effects.*




gram offers other "options"—powerful utilities in themselves. For instance, a sound-synthesis program lets you create your own instrument or sound effects. You control the ADSR (attack, decay, sustain, release) of each sound envelope for the 15 voices, as well as many other items. You can also control a MIDI instrument.

Other options let you add up to three verses of lyrics to your songs, change song titles, turn the GS sound control off and on (while using MIDI), turn off notes, and use four different tracks. You can manipulate tracks to isolate one part of a multipart song. Within each track, you can use all 15 instrument sounds.

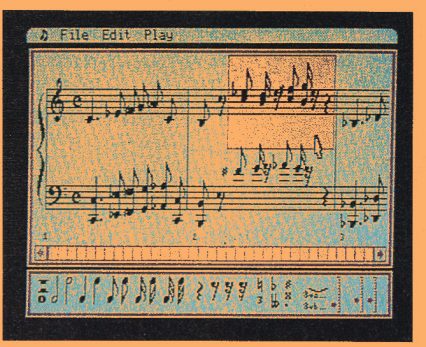
The Music Studio is comprehensive enough to be useful to all levels of musicians. If you know nothing about musical notation, the package includes a separate program, Music Paintbox. This free-form composition tool lets you click different sizes of blocks rather than notes onto the staff. The size of the block determines the duration of the note. The Music Studio automatically converts these marks to standard music notation when you enter the main composing screen. So, there you have it: a program that can satisfy a full range of musical ability and know-how.

## MUSIC CONSTRUCTION SET

The GS version of Music Construction Set (MCS) is great entertainment and a good introduction to the sound of that machine. It comes with excellent song demos and is easy to learn. It's not designed to let you customize your own sounds, nor does it provide for advanced multipart composition. While it lets you play chords of 15 notes, it supports only two different instrument sounds at a time.

The MCS screen shows a grand staff, with pull-down menus above and a host of music tools below. You can select two instruments at a time from two menus, each with 34 predesigned treble or bass instrument sounds; you can't create your own.

*Music Construction Set: A solid introduction to GS music.*




MCS includes measure bars throughout, which are helpful to music students. The staff has a default time signature you can change simply by clicking on it. You have to drag sharps and flats manually to the staff, though, to create different key signatures. Also, music scrolls by in MCS, and time and key signatures disappear after the first few measures are played.

All notes (whole to 32nd), rests, and accidentals are held on screen in a toolbox. To access them, click and drag them onto the staff. As you click each note into position, you hear its sound.

MCS lets you perform the full range of editing functions through menus or, in some cases, with command keys, a nice shortcut for experienced users. You can block certain measures, then move, delete, merge, and copy them into other positions within your song or a different song. Sliders control the volume of each staff and the tempo of the entire song. You can raise or lower the entire piece one octave.

The program includes a handy feature that checks each measure for number of beats and lets you know whether you've placed too many or too few beats per bar. You can also save and print your compositions.

Music Construction Set makes a good introduction to GS music, but it isn't ideal for instruction or serious composition—problems Deluxe MCS, due late this year, may fix. Meanwhile, kids and composers alike can jam with EA's **Instant Music**, a four-instrument freehand composer that creates and plays rough musical lines (though not in real notation) as fast as you can move the mouse.

Music Studio and MCS offer a glimpse into the tremendous versatility of GS music production. You can expect to see other high-quality GS music software coming out—it's a fine music machine.□ **—M.G.M.**

electronic pianos. The MIDI instrument is more than it appears, though: It's a synthesizer that can produce sounds not only like a piano's or organ's, but also like a clarinet's, trumpet's, whistle's, and those of many other instruments. You can also program MIDI units to produce instrument sounds of your own invention. Expect to pay $600–$700 for the least-expensive MIDI hardware-and-instrument combination.

For the professional composer or performer or the just-budding Stevie Wonder, investing in a MIDI system can be an economical way to create your own multitrack recording studio. You can compose on your MIDI instrument in real time and record the music on your Apple, which lets you edit, play back, save to disk, and even print your creation as sheet music. With a flexible MIDI instrument, an interface, and a good sequencer program (see "MIDI for Composers and Performers," below), you can single-handedly record songs with full orchestration and percussion.

## MIDI FOR INSTRUCTION

A MIDI system would benefit any school's music department. As students learn about chords and multipart harmonies, for example, they can hear them rather than study just their structure. Most available MIDI programs teach keyboard skills primarily, but some also cover sight reading and musical notation.

Electronic Courseware's line of MIDI instructional programs includes **Keyboard Blues-MIDI**, a program that teaches blues chords and includes drills and quizzes. Students can compose original blues solos with computer accompaniment. **Keyboard Jazz Harmonies-MIDI** teaches chord symbols, seventh-chord recognition, and chord spelling.

**Ear Training and Sight Singing**, a program in Roland's **Musicom Series**, analyzes and identifies notes you sing into a microphone. It handles single notes, intervals, and tunes and is designed to improve pitch recognition and sight reading. **Keyboard Fundamentals**, another program in this series, includes basic music theory and lessons on right- and left-hand keyboard techniques. On-screen graphics depict hand movements as you play scales on your MIDI keyboard.

**Music Tutor-MIDI**, from Passport, is a three-part series for ear training. It teaches students to hear and identify harmonies and chord structures and allows interaction both through the computer keyboard and the MIDI instrument. The software displays chords and intervals on an on-screen staff in standard notation as it produces those sounds.

More schools are becoming involved in MIDI music education. While MIDI software is more expensive than stock music programs, students benefit from the new dimensions MIDI technology opens.

## MIDI FOR COMPOSERS AND PERFORMERS

Probably the most visible use of computerized MIDI is in

## Product Information

**Aural Skills Trainer**, $99.95 per set, $39.95 per disk
**Keyboard Blues-MIDI**, $79.95
**Keyboard Jazz Harmonies-MIDI**, $79.95
**MicroBand**, $79.95
Electronic Courseware Systems Inc.
1210 Lancaster Drive
Champaign, IL 61821
(217) 359-7099
**Reader Service Number 320**

**Bank Street Music Writer**
Mindscape
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667
$49.95
$149.95, with Mockingboard
**Reader Service Number 321**

**Basic Band Computer Tutor**
Alfred Publishing
15335 Morrison Street
Suite 235
Sherman Oaks, CA 91403
(818) 995-8811
$29.95
**Reader Service Number 322**

**Echo Plus Speech Synthesizer**
Street Electronics
P.O. Box 50220
Santa Barbara, CA 93150
(805) 565-1612
$149.95
**Reader Service Number 323**

**Fingering Series** (woodwind or brass series), $99, $29 per program
**Music Class Series** (Fundamentals, Rhythm, Ear Training, Music Symbols, Note Reading), $195, $39–$49 per program
Wenger Corporation
Learning Division
1401 East 79th Street
Bloomington, MN 55420
(612) 854-9554
**Reader Service Number 324**

**Instant Music**, $49.95
Music Construction Set, $14.95, II; $49.95, GS
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 571-7171
**Reader Service Number 325**

**KidsTime II**
Great Wave Software
5353 Scotts Valley Drive
Scotts Valley, CA 95066
(408) 438-1990
$39.95
**Reader Service Number 326**

**Master Tracks**, $249.95
**Master Tracks Pro**, $299.95
**Music Tutor-MIDI**, $229.95
**Polywriter**, $299.95
Passport Designs
625 Miramontes Street
Suite 103
Half Moon Bay, CA 94019
(415) 726-0280
**Reader Service Number 327**

**Mockingboard**
Sweet Micro Systems
50 Freeway Drive
Cranston, RI 02920
(401) 461-0530
$79, stereo
$74.95, speech upgrade
$149, stereo and speech
**Reader Service Number 328**

**MUSE**, $150
**Musicom Series**, $425
RolandCorp U.S.
7200 Dominion Circle
Los Angeles, CA 90040
(213) 685-5141
**Reader Service Number 329**

**The Music Studio**
Activision
2350 Bayshore Parkway
Mountain View, CA 94043
(415) 960-0410
$79.95
**Reader Service Number 330**

**Personal Musician**, $129.95
**Super Sequencer**, $275.95
Sonus
21430 Strathern Street
Suite H
Canoga Park, CA 91304
(818) 702-0992
**Reader Service Number 331**

**Phasor**
Applied Engineering
P.O. Box 798
Carrollton, TX 75006
(214) 241-6060
$179
**Reader Service Number 332**

**Prokofiev's Peter and the Wolf Music**
Spinnaker Software
One Kendall Square
Cambridge, MA 02139
(617) 494-1200
$39.95
**Reader Service Number 333**

**Stickybear Music**
Weekly Reader Software
245 Long Hill Road
Middletown, CT 06457
(203) 638-2400
$39.95
**Reader Service Number 334**

**SuperSonic Stereo Card**
MDIdeas
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Foster City, CA 94404
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the area of electronic music production and performance. Professional bands use MIDI and a computer to control many different instruments and synthesizers during recording sessions and performances. A single Apple computer can control up to 16 instruments and tools, plus light shows that can be synchronized with songs.

MIDI sequencers and editors are among the most powerful programs available to the musician. This type of software lets you record multitrack songs on disk, then edit them as intricately as you prefer.

Roland's **MUSE** (MIDI Users Sequencer/Editor, reviewed in November 1986, p. 42) lets you use your Apple IIe or II Plus to create eight-track songs of up to 6000 notes each. You can record different instruments on these tracks to create an entire ensemble of sounds. The MUSE sequencer, like most other quality programs of this type, lets you modify measures, transpose tracks, and edit notes, among many other functions.

**Super Sequencer**, from Sonus, is a MIDI recording, editing, and librarian program that can accommodate four songs in memory at one time. Its voice librarian handles a full bank of sounds, to permit editing, reorganization, and disk storage. **Personal Musician** bundles Super Sequencer with a MIDI card and cables.

Passport Design's **Master Tracks Professional Sequencing Software** lets you compose, arrange, orchestrate, and record an unlimited number of tracks assigned to the 16 available MIDI channels. You can compose songs of up to 325,000 notes each. You can perform in real time as the program converts your songs to step time for visual editing.

MIDI also lets you print your compositions. **Polywriter**, from Passport ($299.95), records the songs you play on a MIDI instrument, then transcribes them into musical notation you can view on screen and edit, adding lyrics and chord symbols and printing the composition with up to 16 staves per page.

Many other MIDI utilities are also available, and manufacturers are creating new ones for both the II and the GS. *Voice librarians* let you create and store sound

## An Apple for the Music Teacher

Apple IIs can help music-education students in three areas: reading, instrument practice, and composition.

### THE BASICS

In elementary and middle schools, you can use software to teach students how to read music. The Apple reinforces concepts such as note duration, the functions of flats and sharps, and how measures work. You can get these concepts across with paper, chalkboard, or piano, but they jump to life when expressed visually and aurally on an Apple.

And when students begin studying more advanced concepts, such as time and key signatures, the Apple can really speed things up. With a program like The Music Studio, students can quickly grasp the overall importance of key signatures, for instance: They can see the difference between the key of G and the key of D and *hear* that difference immediately upon clicking the play option. Just loading a song from disk and flipping through different keys provides a concrete example for how keys affect sound.

### INSTRUMENT LESSONS

How many times have you wished you had more time to spend with individual band members for instrument practice? Some schools can afford to offer private lessons, but in many cases that's a luxury. It can become part of your daily music program, though, if you have an Apple.

With programs such as Bank Street Music Writer, Music Construction Set, and The Music Studio, for example, you and your students can enter directly into the Apple the songs your band or orchestra is practicing. You can enter the various parts as stand-alone files or in harmony with several other instruments.

The student who needs extra work on the clarinet, for instance, can then use this program for daily individual practice. He or she can play along with the Apple, either reading from sheet music alongside the computer or directly from the screen. If he or she has trouble understanding the beats of a measure, the Apple can locate and play that section. Combining visual and aural displays makes a tremendous difference in the quality of a practice session. Instead of a teacher going through a part measure by measure with the student, the Apple can step in to help.

You can even use your Apple during band practice with the whole group. When a certain section of instruments is having problems with a part, just click that part on screen and have the computer play it.

One drawback is that many 8-bit programs don't include scrolling functions, so you can't sight read the on-screen music. But in some sound-card and GS programs that do support scrolling, key signatures and time signatures scroll off screen, making on-screen music hard to follow. The music may also move too fast for an instrumentalist to follow.

Bank Street Music Writer provides a compromise. Rather than scrolling, it shows four measures of music at a time while progressing through the song. This, at least, makes it possible for the instrumentalist to read along.

### COMPOSITION

A significant use of Apple in schools is music composition. While you may have students who can sight read and who have the talent for more advanced music study, musical creativity and individual composition often go unnoticed because no one takes the time to encourage music writing. What happens to the student who has musical ideas bubbling out? They're lost if he or she can't record them, but who can afford a studio?

Your Apple can encourage creative expression. For example, a mouse lets a student using The Music Studio move quickly along the staff to drop notes into position. He or she can then go back and insert appropriate note durations. When it's finished, the student can print his or her composition.

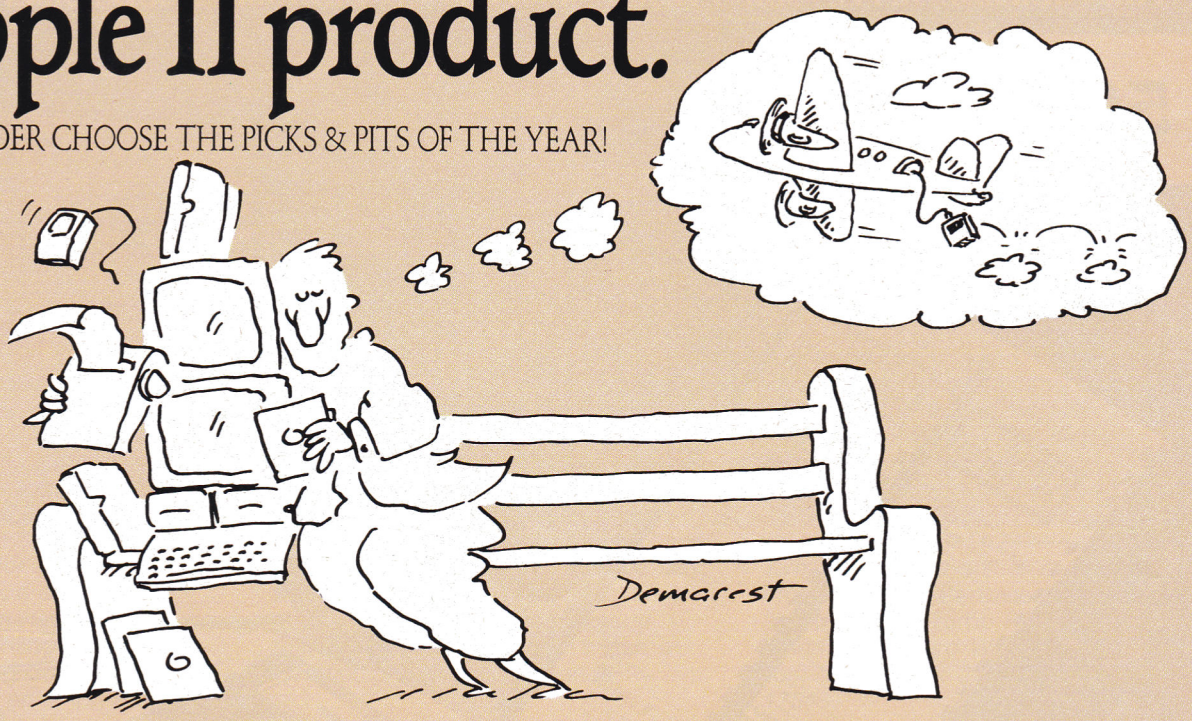
Students may encounter a shock when they first try to write sheet music freehand. Notes look so natural when printed, but so crude when penciled in by hand. It's hard work. Music-composition programs are similar to word processors: They take the messiness and drudgery out of writing music by hand and let students spend more effort on developing their musical thoughts.

### THE ECONOMICAL APPLE

Many schools are experiencing funding cutbacks—which often affect fine-arts departments first. A small school's music program can survive these reductions, though: If you can get just one Apple into your music department, that machine will go a long way toward providing supplemental instruction.□ **—M.G.M.**

# Take a ride on your favorite Apple II product.

HELP INCIDER CHOOSE THE PICKS & PITS OF THE YEAR!




**Win a trip to an Apple trade show!** You've been reading what we think of Apple II products all year. Now it's time to give us your opinion. What's it like out there in the microcomputing trenches? Which products really make your Apple II fly?

Just fill out this entry, listing your favorite products in a wide variety of categories. Then tell us which is your very favorite product and why you like it. The best written entries will win prizes.

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So send in your ballots. The deadline for entries is August 15. And the winners will be announced in the December issue of inCider.

SOFTWARE

Game _____

Classroom education _____

Home education _____

Creativity program (music, painting, etc.) _____

Printing and publishing _____

Word processing _____

Spreadsheets _____

Database management _____

Communications _____

Finance and accounting _____

Disk/file utilities _____

Programming languages/development aids _____

AppleWorks add-on _____

HARDWARE

Hardware peripheral _____

Hardware expansion card _____

OVERALL

Most innovative idea _____

_____

FAVORITE PRODUCT OF THE YEAR _____

WHY: _____

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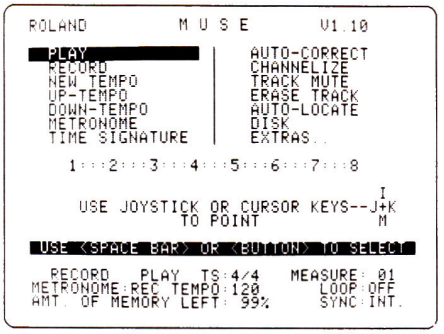
patches you design on your MIDI synthesizer. You can display, edit, print, combine, and compare them to achieve the perfect sound for your compositions. If you don't want to create your own sound patches, you can also buy a *sound library*, a repertoire of sounds ready to use.

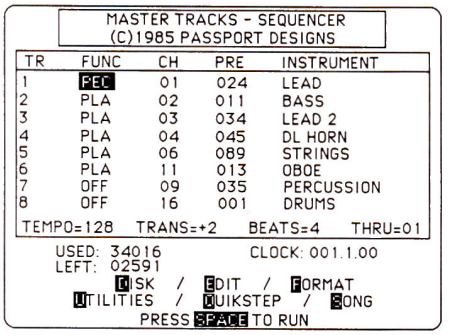
How about talking into your computer and using your own voice in your compositions? An Apple *sound-sampling system* lets you enter your voice or any other sound into your Apple with a microphone, records it, then lets you modify it and play it back. You can also buy recorded sampled sounds.

### THAT'S A WRAP

Yes, your Apple can sing the blues—and classical, jazz, rock, and baroque, too. Whether you're a parent whose child is just learning the basics of music, a music teacher responsible for an entire student band, or a composer or performer headed for the bright lights, there's Apple software to fit your needs. For composition, editing, and performance, your II is the most versatile instrument a musician ever played.■

*Margaret Gorts Morabito is a free-lance journalist specializing in technical topics. She has used computers as teaching tools since 1980 and directs an on-line community college and tutoring center on QuantumLink. Write to her at P.O. Box 132, Rindge, NH 03461.*




*Top, MUSE; bottom, Master Tracks.*

# Technical Tunes

POKE 49200,0

Did you hear anything? Type in that line of BASIC on any Apple II and you'll hear Applesoft's range of musical ability: Putting any value into memory location 49200 "clicks" the speaker. If you had something more melodic in mind, type in this little program:

```
10 POKE 49200,0
20 GOTO 10
```

The buzz you hear is your Apple struggling to sing—its tiny speaker clicking quickly. Faster clicking means a higher note; an Apple with an accelerator card hums at a higher pitch than an unadorned one. The faster the click—that is, the higher the *frequency*, in the language of music and physics—the higher the note.

The two-line program above produces the highest pitch the machine can attain with BASIC. You can lower the pitch by adding lines such as the following:

```
11 PRINT "Now wait just a minute. . ."
12 PRINT ". . .while I sing a little lower."
```

So how can those nifty Apple II music programs play so well? Two tricks: machine language or a hardware addition. Boards such as the Mockingboard, Phasor, and Echo Plus bypass the Apple altogether.

But you can make your Apple sing in machine language, too. Machine language is faster than BASIC; it's your Apple's "native tongue," and doesn't require translation. By varying the speed at which the speaker clicks, you can vary the pitch of a note.

Machine language isn't easy to understand, but if you want to write a music program on an Apple II, you're going have to buckle down and type in some machine-language (binary) code—even if you don't have the foggiest idea what it means. If you do know what it means, copy some real computer sound routines from Roger Wagner's *Assembly Lines: The Book* (Roger Wagner Publishing) or Don Lancaster's *Assembly Cookbook for the Apple II/IIe* (Howard W. Sams Publishing).

Sound, the accompanying **Program listing**, is written in machine language, so you'll have to type CALL -151 from BASIC before you type it in. (Sound is based on the program Muse, from *Microcomputers and Music*, by Gary Wittlich, John Schaffer, and Larry R. Babb, Prentice-Hall, 1986.)

You'll know you've entered the "system monitor" when you see an asterisk instead of the square-bracket BASIC prompt. Type in the code and remember to press Return at the end of each line. Type Control-C and Return to get back to BASIC; type BSAVE SOUND,A$300,L$20 to save your machine-language code to disk.

To hear your program, type either BRUN SOUND, or BLOAD SOUND, CALL 768 from a BASIC program. (CALL 768 runs the machine-language program in memory.)

This short program can do more than make a single noise; you can alter the pitch and rhythm of a note, too. That's pretty complex, though. You have to POKE a value between 2 and 255 into memory location 1 (POKE 1,255), a value between 1 and 8 into memory location 2 (POKE 2,8), and a couple of values into locations 3 and 4 (POKE 3,244 and POKE 4,200).

If music programming in BASIC perks up your ears, I recommend you read *Microcomputers and Music*, to learn how you can turn this simple Sound program into real Apple II music.□ **—Paul Statt, Technical Editor**

```
300: A2 01        311: C6 02
302: A0 01        313: F0 06
304: CA           315: 8D 04 00
305: D0 FD        318: 38
307: 88           319: B0 E9
308: D0 FA        31B: C6 03
30A: AD 30 C0     31D: D0 E5
30D: A6 00        31F: 60
30F: A4 01
```

***Program listing.*** *Sound, a machine-language routine that activates the Apple speaker.*

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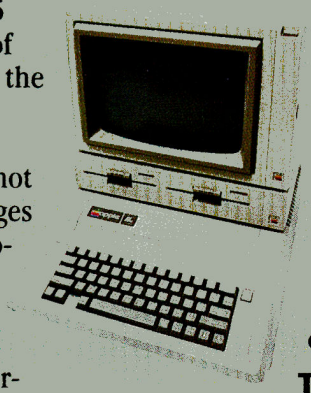

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# LASER 128EX

*Take a long look at Video Technology's newest Laser, the 128EX. It's sleek, fast, loaded with options—and it's priced at less than $500.*

by Eric Grevstad, Review Editor

If you still don't take the Laser seriously, stand back. Last year's Laser 128 made waves as the industry's cheapest Apple compatible, but Video Technology's new Laser 128EX turns the low-cost clone into a power user's hot rod. It looks like a IIc, has enough standard equipment to fill every slot in a IIe, and runs faster than a IIGS. It has plenty of input/output ports, plugs into virtually any Apple disk drive, has the same triple-speed processor as Applied Engineering's TransWarp accelerator card, and can hold a megabyte of on-board memory. It costs $495.

The 128EX is scheduled to go on sale this month. We tested one supplied by Central Point Software of Portland, Oregon—according to Central Point President Michael Brown, a not-quite-production unit made for our mid-May deadline before the Hong Kong factory reached full speed. Our 128EX had a couple of teething problems, but was fast, attractive, and highly compatible with Apple II software. It's not compatible with IIGS software, sound, and graphics, but if it proves reliable it'll be everything an 8-bit user could wish for, at somewhere between one-half and one-third the cost of a comparably equipped Apple. The Laser EX is an exceptional bargain.

## A FEW REVISIONS

Like the original 128, the EX comes to America with two parents. Video Technology's Northbrook, Illinois, office imports Lasers for most mail-order and retail dealers, including chains such as Softsel and Sears. (The latter is a coup for Laser, since last year Sears chose the Franklin Ace 500.) The official retail price is $579. Individual customers can also buy directly from Central Point (9700 S.W. Capitol Highway, Portland, OR 97219, 503-244-5782); Brown told us that his firm will leave the base model to mass merchandisers and sell only the 128EX, at $495 plus shipping.

Basically, the EX is a revised edition of the Laser 128. (See "Laser 128: An Affordable Compatible," December 1986, p. 58.) Both machines are compatible with the enhanced Apple IIe, in a case with a built-in disk drive and interfaces like the IIc's—two serial (printer and modem), external disk drive, composite- and RGB-color video, and mouse/joystick ports—plus a numeric keypad, a parallel printer port, and one expansion slot.

There are four changes, two of which are shared with the revised 128 base model (still around $395): a restyled case in a lighter gray (close to Apple's platinum) color, and circuitry from Central Point's Universal Disk Controller card, allowing connection to either a 5¼- or 3½-inch external drive, built in.

The two EX extras are a faster CPU—its 65C02 can run at 2.3 or 3.6 megahertz as well as the standard 1.0-MHz clock speed—and an internal Apple-type memory card serving as a ProDOS RAM disk or AppleWorks 2.0 expander. In the $495 version, the card is empty; it's socketed for up to 1 MB of 120-nanosecond RAM chips. (The more common 150-nanosecond chips, Brown says, aren't fast enough.) Officially, added RAM is a dealer-installable option, but there'll be a door in the metal shield beneath the plastic case for those adventurous enough to try their own upgrades.

## LOOKING INTO THE LASER

Even those who thought the original 128 stark or homely must admit the 128EX looks sharp. The lighter color, rounded corners, and stylized top panel and logo (replacing industrial ventilation slots and a stick-on name label) give the new Laser a sleeker, streamlined appearance.

The keyboard is unchanged, with convenient keypad and controls such as a speaker-volume dial and monochrome/color-display switch making up for the ten

nearly useless function keys. Compared to our first Laser's, the keyboard feels smoother and less plastic—a good improvement, though the sensitive spacebar still puts occasional double spaces between words. The Laser still boots up with Caps Lock on, tricking users into loading their word processors each morning and typing "DEAR SIR."

Our test EX didn't contain the production ROM chip (mounted, like the original Laser's, in an underside socket for replacement without removing the outer case). The finished ROM, Brown told us, will include RAM diagnostics, plus DOS 3.3, Pascal, and ProDOS RAM-disk support.

One early bug was that, when connected to an old composite Monitor III, the EX display appeared on the bottom left, with the first column obscured, instead of centered on the screen. The image was properly centered on a composite Taxan and a monochrome IIc monitor; on a Color Monitor IIe and IIc, it was centered vertically but pushed left (but not far enough to hide column 1). Brown said, "Those old Monitor IIIs are a little weird," but promised to investigate the bugs.

The original Laser was impressively compatible with Apple software, and today's Lasers are even more so. Like its predecessor, the 128EX ran almost every program we tried—AppleWorks 1.3 and 2.0, Apple Writer II, Certificate Maker, Award Maker Plus, Bank Street Writer Plus, ProTerm, Fantavision, F-15 Strike Eagle, SuperCalc3a, WordPerfect, Airheart, Accolade's Comics, The Lurking Horror, and more. An *inCider* BBS user had complained that his Laser flunked Activision games and Ogre; the 128EX played our copies perfectly. Our old 128 gagged on Garry Kitchen's GameMaker; the EX had no trouble.

We did have a few failures. Both our old and new Lasers skewed screen captions on Point-to-Point 1.50 (an old version of the program, since fixed). MultiScribe 2.0A worked, but didn't follow a mouse plugged into the 128EX mouse/joystick port as other mouse-controlled software did. Baudville's Rainy Day Games booted to its menu, but crashed while loading a game. MECC's Number Munchers wouldn't boot—a problem that, like the Laser's inability to run the IIc System Utilities, may be somehow related to its emulating an enhanced IIe. Number Munchers also hung up on our enhanced IIe, but not an old IIe or IIc.

## SPEED AND SLOTS

Overall, though, the 128EX earns the same high marks for running Apple II programs that the first Laser did—and bonus points for running most of them three times as fast. The EX is a three-speed computer; holding down the 1, 2, or 3 key during power-up or pressing Control-Reset sets its clock rate to 1.0, 2.3, or 3.6 MHz, indicated by the changing pitch of a beep. (The Laser ROM works at either 1.0 or 2.3 MHz, so BASIC programs show little improvement when shifted from second to third gear, though they're still twice as fast as on a 1.0-MHz IIe or IIc.)

Using a 1000-cell AppleWorks spreadsheet as an example, the Laser in first gear recalculates as quickly (or slowly) as a IIe—38 seconds. The medium speed cuts that to 16.7 seconds, which trails the Apple IIGS' 14.4. But a Laser in top gear tops that—11.3 seconds.

If you insist on maximum speed, a IIe with Applied's TransWarp edges the EX by two-tenths of a second. Nevertheless, EX owners will soon learn what accelerator-card users know: Triple-speed games can be tricky, but fast searches, sorts, and number crunching spoil you for ever going back to 1.0 MHz. Running AppleWorks with a macro program on a Laser with turbo speed and a megabyte of RAM is going to be a pleasure.


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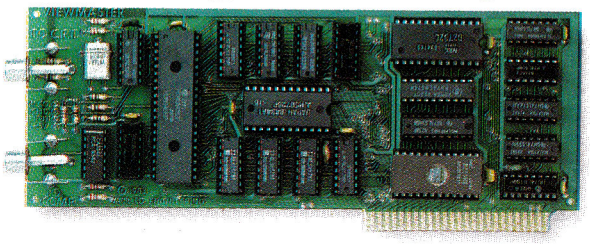

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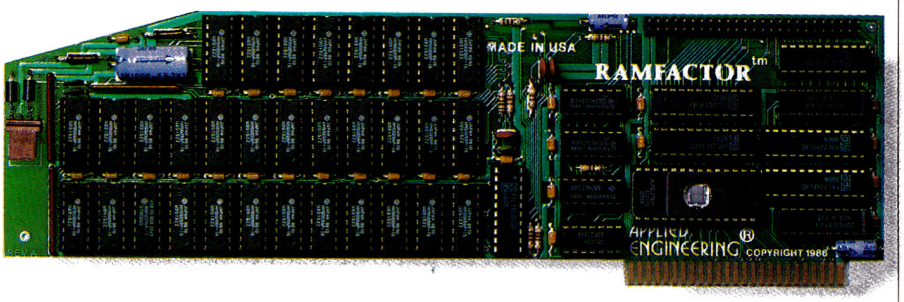


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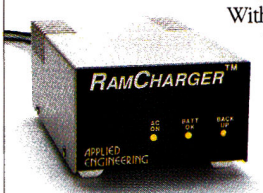


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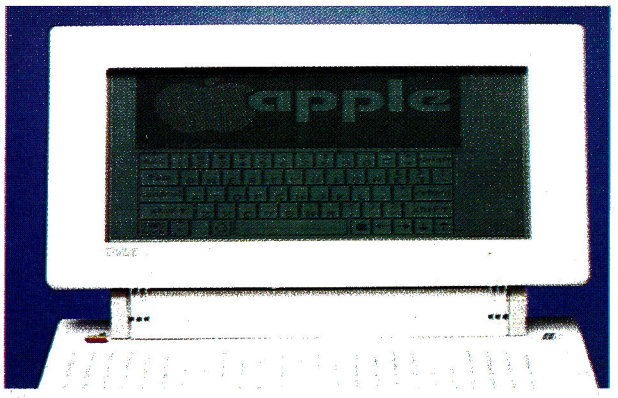

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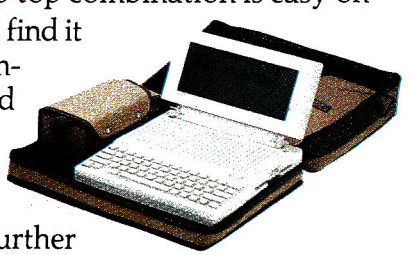

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Got AppleWorks on a 3½-inch disk? No problem. As before, the Laser's built-in 5¼-inch drive is slot 6, drive 1, and a 5¼-inch drive plugged into the rear connector is slot 6, drive 2. The new disk controller, however, will recognize a 3½-inch drive in the same connector as slot 7, drive 1, and boot from it if there's a disk present. (You can't daisy-chain multiple drives as with the GS SmartPort, however.)

The Chinon-built Laser 800K drive ($195) has improved since last fall's first models: There's still the manual-ejection button Apple forgot, but the drive is considerably quieter and has an LED (light-emitting diode) access light. Future models will follow the new color scheme, too.

Our 128EX also worked with an Apple UniDisk 3.5 and the platinum Apple 3.5 Drive from a GS, though the latter moaned and groaned and was three times slower, loading ProDOS 8 and a BASIC STARTUP program in 33 seconds to the other microfloppies' 10. The EX also accepted a single-sided Mac drive, if you'll accept only 400K storage and a bent paper clip to eject disks.

We should make one point clear: You can't use a 3½-inch drive and a card in the Laser's expansion slot at the same time (unless the card is the 3½-inch disk controller, which seems rather pointless). Software sees the EX as a IIe with a parallel or serial (depending on a keyboard switch) printer card in slot 1, a modem card in slot 2, an extended 80-column card in slot 3, a mouse card in slot 4, the memory-expansion card in slot 5, a 5¼-inch disk controller in slot 6, and the 3½-inch controller in slot 7.

This gives you two ProDOS RAM disks (/RAM in slot 3 and /RAM5 on the expansion card) and the ability to plug in a second drive of either size, but disables the slot on the Laser's left side. To change that, a DIP switch next to the underside ROM socket toggles slot 7 between the 3½-inch disk controller and the external slot; the cards we then tried, such as Micro Systems Research's Clockworks and Prometheus' ProModem 1200A, worked successfully.

Another DIP switch disables the RAM card for an external slot 5, in case you want to use the old Laser two-slot expansion box. Central Point feels one slot is sufficient considering the EX's new built-in features; the firm says it plans to offer a snap-on plastic end cap to protect a card mounted in the slot while maintaining portability.

Low-cost imports naturally raise different questions of reliability than domestic brands. We've had mail from happy owners whose 128s are holding up to hard knocks; we've heard from buyers unhappy with Laser breakdowns. When *inCider* asked Video Technology President David Gish about reliability, he said, "We feel the quality has been improved quite a lot since last fall; some running changes we've made have improved that dramatically [since our first units] and we're not getting any complaints now." For repair after the 90-day warranty, Gish added, a growing number of Laser dealers have joined Central Point and Video Technology as service centers.

On the technical side, Brown told us, the 128EX has a feature that should reduce complaints: The 1.0-MHz mode and disk-drive speed now match Apple's instead of being 2 percent slower, which caused some problems with IIc drives and an occasional "rainbow" effect when displaying certain hi-res colors. We'll be pounding on *inCider*'s test unit pretty heavily from now on, and we'll let you know if anything goes awry.

We'll also be using the EX heavily because it's an impressive machine. It's not for you if you want the 16-bit software, music, and graphics of the IIGS, but it's a big change from the simple budget-conscious, Commodore-alternative stance of the original 128. The Laser 128EX is a fully loaded, souped-up, tricked-out computer in a neat compact package, at a price that should make Apple blush for shame. This dark horse is moving up fast.■

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| Fraction Factory or Make a Match | 18.00 |
| Mask Parade or Easy as ABC | 24.00 |
| Rainbow Painter or Puzzle Master | 21.00 |
| **Terrapin** Enhanced Terrapin Logo V3.0 | 64.00 |
| **Weekly Reader** | |
| *Stickybear Series:* Sticky Bear ABC, Car Builder, Codes & Cyphers, Basic, Basket Bounce, Drawing, Math, Math II, Math Word Problems, Music, Numbers, Opposites, Parts of Speech, Printer, Reading, Reading Comprehension, Shapes, Spellgrabber, Typing, & Townbuilder *(each)* | 23.00 |

## Modems

| | |
|---|---|
| **Anchor Automation** | |
| Signalman Express 1200 | 199.00 |
| Signalman Lightning 2400 | 299.00 |
| **Hayes** Hayes Micromodem IIe *(Internal)* | 139.00 |
| Hayes Smartmodem 1200A *(Internal)* | 299.00 |
| Hayes 300 Baud Smartmodem IIc w/Smartcom I | 169.00 |
| Hayes 300 Baud Smartmodem | 139.00 |
| Hayes 1200 Baud Smartmodem | 379.00 |
| Hayes 2400 Baud Smartmodem | 579.00 |
| **Prometheus** Pro Modem 1200 *(External)* | 239.00 |
| ProModem 1200G *(Non Expandable)* | 169.00 |
| Pro Modem 2400 *(External)* | 309.00 |
| Pro Modem 2400G *(Non Expandable)* | 249.00 |
| Pro Modem 1200A *(Single Card)* | 199.00 |
| Pro Modem 300c | 89.00 |
| Communications Buffer *(2K Exp. to 512K)* | 105.00 |
| Alphanumeric Display | 69.00 |
| **U.S. Robotics** U.S. Robotics Courier 1200 | 199.00 |
| U.S. Robotics Courier 2400 | 359.00 |
| U.S. Robotics Courier 2400E | 459.00 |
| U.S. Robotics Courier 9600 | 729.00 |

## Accelerators/Ramcards/Z-80/80 Column Cards

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|---|---|
| **Advanced Logic Systems** Add-Ram 80/64 | 52.00 |
| **Apple Computer** | |
| Apple IIe Extended 80 Col. Card | 89.00 |
| Apple IIe Enhancement Kit | 49.00 |
| **Applied Engineering** | |
| RamWorks III *(64K to 3 MB)* | Call |
| RamWorks Expander 512k or 2M Ver. | Call |
| RamFactor *(256K to 1MB)* | Call |
| Z-RAM Ultra 1 *(256K or 512K)* | Call |
| Z-RAM Ultra 2 or 3 *(256K to 1Meg)* | Call |
| GS-RAM *(256K to 1.5Meg)* | Call |
| GS-Ram Plus *(1MB to 6MB)* | Call |
| Phasor *(II+, IIe, and IIGS)* | 139.00 |
| TransWarp Accelerator *(II+ and IIe)* | 219.00 |
| ViewMaster 80 *(II+)* | 119.00 |
| Z-80 Plus *(II+, IIe, IIGS)* | 119.00 |
| **AST Research** | |
| Ramstack Plus IIGS *(256K)* | 105.00 |
| **Checkmate Technology** | |
| MultiRam CX *(256K)* | 139.00 |
| MultiRam CX *(512K)* | 175.00 |
| MultiRam CX+ *Piggyback (512K)* | 199.00 |
| MultiRam IIe *(128K)* | 129.00 |
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| MultiRam RGB *(320K)* | 189.00 |
| MultiRam IIe *(576K)* | 189.00 |
| MultiRam RGB *(576K)* | 219.00 |
| MultiRam RGB *(832K)* | 249.00 |
| MultiRam RGB *(1024K)* | 269.00 |
| Zee-80A | 55.00 |
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| OctoRam ESP *(Extended Static Ram w/256k)* | 149.00 |
| OctoRam ESP Upgrade Pack *(64k Static Ram)* | 32.00 |
| **Micro Sci** Micro Sci 80/64e | 52.00 |
| **Orange Micro** | |
| Rampak 4GS *(512k Exp. to 4MB w/Utilities)* | 169.00 |

## Printer Interface Cards

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|---|---|
| **Apple** Apple Super Serial Card | 115.00 |
| **Applied Engineering** | |
| Serial Pro *(II+, IIe, IIGS)* | 135.00 |
| **Apricorn** Apricord IIc | 54.00 |
| Super Serial Card | 92.00 |
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| Pro Grappler *(Apple IIe or IIGS)* | 75.00 |
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| Buffered Grappler+ | 119.00 |
| Grappler IIc | 79.00 |
| Hot Link | 49.00 |
| **TextPrint** Print-It! *(Parallel or Serial)* | 132.00 |
| **Thirdware** *Choice of Parallel, Serial (ImageWriter I) or Serial (ImageWriter II)* | |
| Finger Print Plus II+, IIe, IIc | 89.00 |

## Clock/Calendar Peripherals

| | |
|---|---|
| **Applied Engineering** | |
| TimeMaster H.O. | 79.00 |
| IIc System Clock | 65.00 |
| **Creative Peripherals** IIc System Clock | 65.00 |
| **SMT** No Slot Clock *(II+ & IIe)* | 69.00 |
| **Thunderware** Thunderclock Plus | 109.00 |

## Accessories

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|---|---|
| Kensington System Saver *(Platinum or Beige)* | 64.00 |
| Conserver *(IIGS Switched Surge Suppressor w/Fan)* | 99.00 |
| Curtis Diamond | 29.00 |
| Curtis Emerald | 36.00 |
| Curtis Ruby | 54.00 |
| Curtis Sapphire | 47.00 |
| Apple Mouse IIe | 119.00 |
| Apple Mouse IIc | 89.00 |
| AST-VisionPlus Digitizer *(IIGS)* | 219.00 |
| SuperSonic *(Stereo Card for IIGS)* | 32.00 |
| SuperSonic Digitizer *(IIGS)* | 32.00 |
| Hayes Mach II Joystick | 29.00 |
| Hayes Mach III Joystick | 35.00 |
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| Koala Pad Plus w/Graphics Exhibitor | 79.00 |
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| The Cricket IIc | 109.00 |
| Rainbow Paper Pak *(300 Sheets)* | 14.00 |
| ImageWriter Ribbon-Black | 4.50 |
| ImageWriter Ribbon-Color | 5.00 |
| ImageWriter II - 4 Color Ribbon | 12.00 |
| ImageWriter Rainbow Pk. (6 Colors) | 27.00 |

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| Verbatim 5.25" SS/DD *(box of 10)* | 10.00 |
| Sony 5.25" SS/DD *(box of 10)* | 9.00 |
| Maxell 5.25" SS/DD *(box of 10)* | 10.00 |
| 3M 5.25" SS/DD *(box of 10)* | 12.00 |
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| Bulk *(Sony)* 3½" DS/DD *(box of 10)* | 19.00 |
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| C. Itoh 3.5" DS/DD Color Disks *(box of 10)* | 26.00 |

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|---|---|
| **Brother** M-1109AP *ImageWriter Comp.* | 259.00 |
| M-1409 *(180cps Dot Matrix NLQ) 10"* | 349.00 |
| M-1509 *(180cps Dot Matrix NLQ) 15"* | 389.00 |
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| TwinWriter 5 | Call |
| **Citizen** | |
| MSP 120D *(120cps Dot Matrix 10")* | 189.00 |
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| MSP 20 *(200cps Dot Matrix 10")* | 329.00 |
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| MSP 25 *(200cps Dot Matrix 15")* | 489.00 |
| Premier 35 *(35cps Daisywheel 15")* | 489.00 |
| **Epson** LX-86 | Call |
| FX-86e | Call For |
| FX-286e | Most |
| LQ-800/1000 | Recent |
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| LQ-2500 | Prices |
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| **Panasonic** KXP-1080AP *(100 cps) ImageWriter Compatible* | 689.00 |
| KXP-1080i *(120 cps)* NLQ Mode | 249.00 |
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| KXP-1595 *(240 cps)* NLQ Mode | 419.00 |
| KXP-3131 *(16 cps)* Daisywheel | 499.00 |
| KXP-3151 *(23 cps)* Daisywheel | 259.00 |
| **Star Micronics** | 409.00 |
| NX-10 *(120cps Dot Matrix/NLQ 10")* | 229.00 |
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| NP-10 *(100cps Dot Matrix/NLQ 10")* | 189.00 |
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| NR-15 *(240cps Dot Matrix/NLQ 15")* | 529.00 |

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| *Mix and Match 5¼" & 3½" Drives:* | |
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| Sider 10MB Hard Drive | 529.00 |
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| B Sider Tape Backup | 599.00 |
| Blank Tape 5 Pack | 59.00 |
| **Hi-Tech Peripherals** | |
| Full Height 5¼" Drive for Apple IIe | 139.00 |
| Half Height 5¼" Drive for Apple IIe or IIc | 139.00 |
| Half Height 5¼" Drive Platinum for IIGS | 169.00 |
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| **Micro Sci** | |
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| **Mitac** | |
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| Apple Half-Height II+, IIe, IIc | 139.00 |
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# Experiment with Apples

*The right hardware and software can turn your Apple into the perfect lab partner.* inCider *surveys more than a dozen school science programs, offering measurement capabilities and simulation of experiments in everything from botany to astronomy to the scientific method.*

by Kenneth W. Carlson

The scene is familiar: Mr. Scott leans over the terminal and breathes, in his thick Scottish brogue, "Computer!"

Uhura's smooth voice replies, "Ready." She enters the data, the computer does the work, and the problem—analyzing the latest power malfunction—is solved.

Although Apples in school science labs can't respond quite as efficiently as the terminal aboard the Enterprise, we've moved quite a distance from the drill-and-practice days of just a few years ago. Now, the Apple acts as a partner in the lab, measuring temperature and pH, acting as a precision timer, and functioning as a lab tool in a hundred other ways.

The Apple can also help students perform experiments, such as plant-growth simulations, in a fraction of the time they ordinarily require—and students learn the scientific method in the process. The Apple can function as a bloodless dissection pan, and can broaden the experience of the student by simulating experiments that might be too difficult or dangerous to perform in a school lab.

Check out the variety of Apple programs now available for school science courses. (See the accompanying Product Information box for details.) There are prices and features to suit all levels of science instruction. (One word of advice: If hardcopy's important to you, find out which printers and interface cards are supported by the software you're considering. Some programs won't print data.) In sum, Apples are now realizing the promise of their early years: They're becoming full-fledged partners in lab and in class, indispensable tools in the arsenal of science education.

## SIMULATING THE LAB

One of my constant complaints as a science teacher is that the school environment doesn't afford enough time to perform many of the experiments that would have real

meaning for students. Observing the effects of various environmental factors or breeding schemes on plant growth, for example, could take months or years. (Remember how long Mendel worked on those peas.)

How should you go about teaching lab botany? **Botanical Gardens**, from Sunburst Communications, and Educational Activities' **Micro Gardener** let the teacher or student simulate plant growth on screen. By manipulating environmental parameters such as heat, water, light, and nutrients, the student learns the optimum conditions for general houseplant growth. These programs graph the results, and students can draw conclusions from the data they display.

Botanical Gardens also includes one unique feature: You can design a seed. You name your hypothetical plant, determine its appearance (the program draws it on screen), and define its growth parameters (the plant's response to such factors as water and soil conditions). You can then save your data to become part of the program's "seed library." The package includes a backup disk (a definite plus for teachers) and suggested lesson plans.

These programs show one of the Apple's more important features for education: its ability to interact with the student, which distinguishes it from the "teaching machines" of a few years ago and promotes development of critical-thinking skills. With a program such as **Characteristics of a Scientist**, students can play games, answer questions, make decisions, and watch the computer respond to each input. If you make a poor decision or answer incorrectly, the program explains the alternatives. In the meantime, the student learns the features that characterize a good scientist.

Both **Discovery Lab**, from MECC, and **Discover: A Science Experiment**, from Sunburst, let students vary data input to try to discover the precise environmental conditions that will keep hypothetical organisms from outer space alive. These programs encourage students to keep

notes and help them realize the importance of controlling variables—a primary tenet of the scientific method. Entering the wrong data into the computer means that their alien organisms won't thrive.

The programs encourage students to apply the experience they gain through software experimentation to actual lab situations. They're especially valuable as practice runs just before students conduct hands-on lab experiments.

**Planetary Construction Set**, also from Sunburst, offers an even more complex level of student interaction. The mission here is "simple": construct a planet. To gain experience in the art of generating a scientific hypothesis, gathering and analyzing data, designing experiments, and so forth, students design a planet, complete with environmental parameters, then populate it with specific aliens. The Planetary Construction Set gives students experience in higher-level thinking—especially scientific reasoning.

## THE APPLE AS LAB ASSISTANT

Current hardware and software offerings now let Apples function as laboratory instruments. Although such hardware has been around for some time, the software is just now becoming more affordable for schools.

Clearly designed for use in the school lab, programs such as Broderbund's **Science Toolkit**, HRM's **Experiments in Science**, and **The Temperature Plotter**, from Vernier Software, help even the novice science teacher use the Apple as a functioning lab instrument.

With an eye toward lab safety, using your Apple to illustrate data from hazardous experiments is particularly attractive. For example, adding acid to water produces an enormous amount of heat. How can students measure it safely when the test tube's too hot to handle?

With Vernier's Temperature Plotter system, you can demonstrate on screen that rise in temperature. First attach one of the temperature probes provided to a test tube containing 25 milliliters of water. Take one measurement every five seconds for one minute. The program displays the results as a point graph, line graph, or bar chart—your choice.

Let's say you find the base temperature of the water to be 25.1 degrees Celsius, or centigrade (about 79 degrees Fahrenheit). Now add 5 milliliters of sulfuric acid to the water and watch on screen as the temperature of the mixture rises from 25.1 to 63.7 degrees Celsius (about 147 degrees Fahrenheit) by the end of the sampling period—another minute. The speed of the rise in temperature, combined with the range of the temperature of the mixture, has an impact on students—they're not likely to forget this demonstration.

The Temperature Plotter is well suited to school labs for several reasons. First, the temperatures it can sample vary from −55 to 155 degrees Celsius, which covers the range likely to be encountered in the average school lab. (That's about −67 to 311 degrees Fahrenheit.) Second, the probes are fairly resistant to chemicals. Vernier also offers the system for sale as a kit—at considerable savings—so that those with a mechanical bent can construct their own probes. The software is noncopy-protected and can be networked without an additional fee.

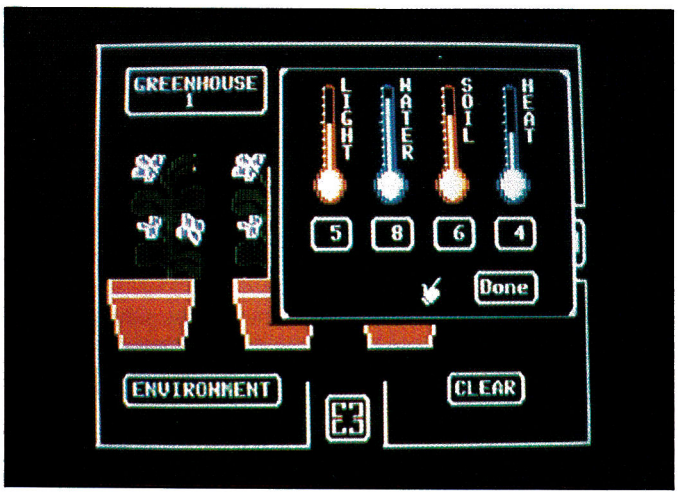
The developers at Broderbund have come up with an ingenious set of hardware and software for Science Toolkit. The latest version of the complete kit is now expanded to include not only the Master Module, but two additional modules (Speed & Motion and Earthquake Lab), as well. The package uses temperature and light probes to measure all kinds of phenomena: the evaporation of water from a cotton ball, the inverse-square law as applied to light intensity, acceleration of propelled objects, and vibration on the earth's surface.

Science Toolkit is relatively inexpensive (less than $200 for all three modules, teacher's guide, and backup disk) and functions as a guided tour of basic science experiments and science information. Designed to be plugged into the Apple's game port, the Toolkit stresses lab safety and responsible experimental techniques at all times.

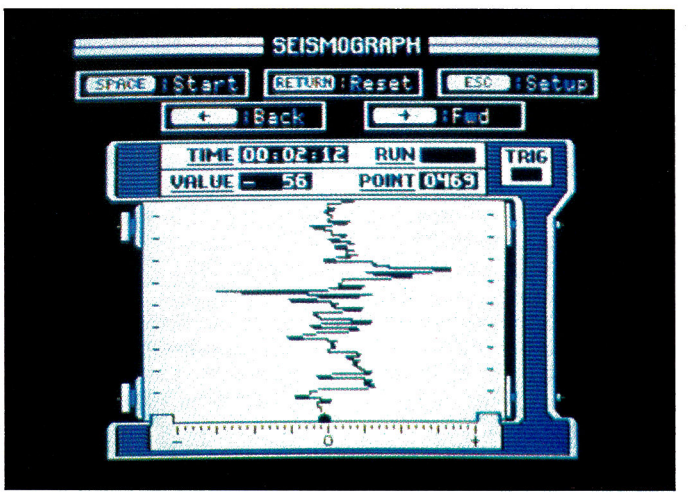
The Master Module includes step-by-step instructions for 27 experiments in plant growth, motion, light meters, and other areas. One drawback is its lack of a screen-dump command (such as AppleWorks' Open apple-H). Instead, you must first save your data to disk, then access your printer. On the whole, though, Science Toolkit is efficiently designed and easy to use.

The thermistor supplied with the Toolkit measures temperatures between 10 and 140 degrees Celsius. An alarm sounds when the temperature approaches maximum. The photocell supplied with the kit reads light intensities between 0 and 500 footcandles.

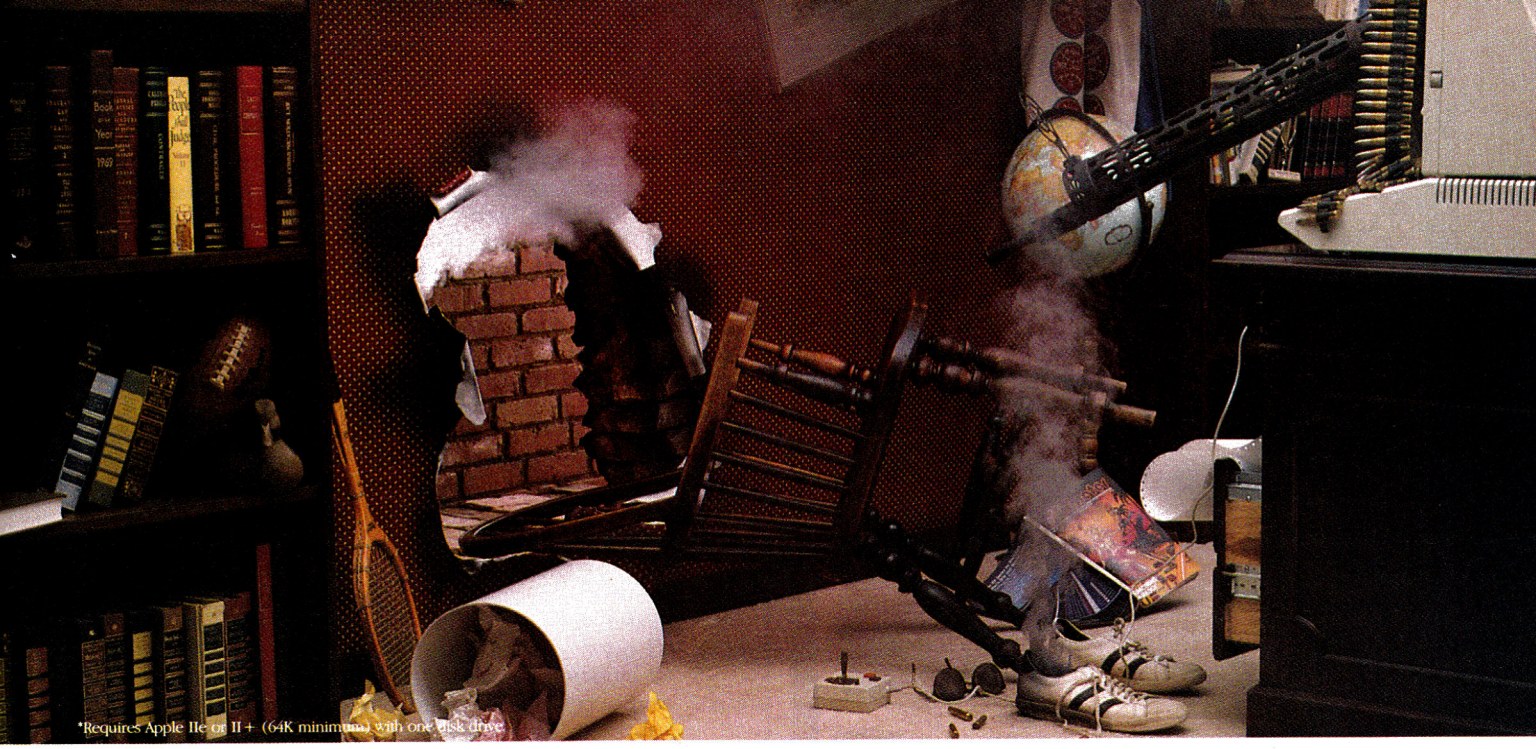
The first Toolkit extension, Speed & Motion, adds another photocell. With two photocells plugged into the interface box, you can measure the speed and acceleration of a small balloon-powered car. Photocells play a critical role in the second expansion module, Earthquake Lab, as well. Here, a photocell responds to the movements of a seismograph you construct with the kit. The movement of a suspended weight responding to ground vibration breaks




*Manipulating environmental factors to test for optimum growth with Botanical Gardens.*




*Earthquake Lab lets students construct a seismograph and interface it to an Apple.*




# Prepare to be blown away by your Apple.™

*Phasor produces sound effects, music, and speech so striking, Applied Engineering feels you should be warned.*

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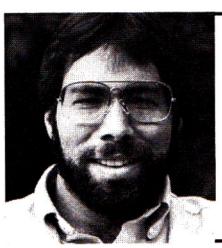

***"I recommend Applied Engineering products wholeheartedly!"***

*Steve Wozniak, the creator of Apple Computer*

What's best, the Phasor works with more off-the-shelf software than any other sound card you can buy. So now all your favorite games — like Skyfox™, Under Fire™, Willy Byte™, Tactical Armor Command™, Maze Craze™, Zaxxon™ and Ultima IV™ — can have shattering sound effects. Educational packages like Music Construction Set™, Guitar Master™ and Music Star™ are also dramatically enhanced.

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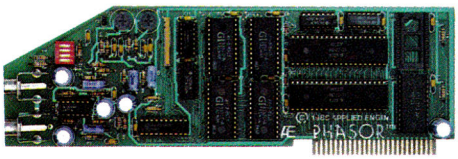
The Phasor comes with its own easy-to-use software (ProDOS based), including 30 ready-to-run, non-copy protected songs and sound effects along with a Music Editor, Sound Effects Editor and Text to Speech program. And of course, it carries our no-hassle, five-year warranty.

Order a Phasor for your Apple today — and prepare to be blown away! Call (214) 241-6060 to order (9 a.m. to 11 p.m. 7 days). Or send check or money order for $179 to:

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the path of the cell's beam of light.

This relatively sensitive instrument can measure everything from the movement of students in a classroom to real tremors and quakes.

With the manuals' factual material, their introduction to lab techniques and to various physical sciences (seismology, motion studies, and so on), the package's emphasis on safety, and the comprehensive teacher manuals with suggested experiments, Broderbund's Science Toolkit is an invaluable addition to the school lab. Even elementary-school students can follow these experiments, yet they provide meaningful activities for more advanced students, as well. Data output and flexibility are impressive, for one thing. For example, I ran a temperature experiment and ended up with 29 pages of samplings for one minute 45 seconds of experimentation—about 13 or 14 temperature samplings per second. The Toolkit records up to 4000 data points per time period, which can be up to 24 hours long.

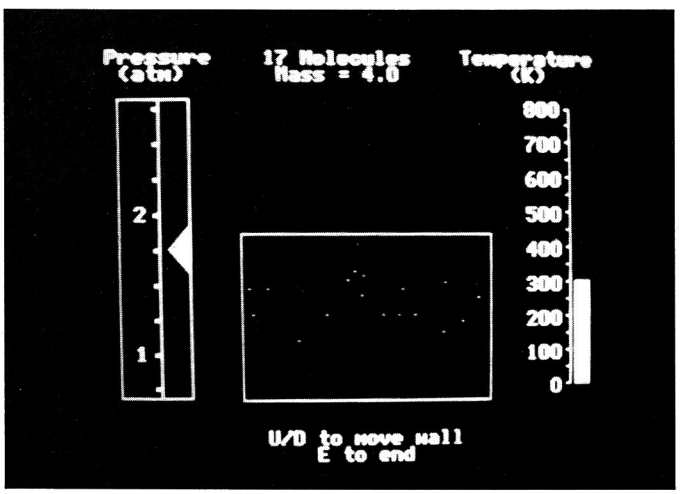
HRM's Experiments in Science is rather expensive compared to other packages, but it performs a wide variety of sophisticated experiments in chemistry, physics, physiology, and earth science.

The kit includes temperature and light probes, lesson plans, and suggested experiments on topics such as heat of neutralization, chemical-reaction rates, light-energy equivalence, and more.

One interesting biology experiment particularly exemplifies the usefulness of Experiments in Science. Through probes, clipped to the pads of your fingers (or your ear lobe in the latest version), the Apple "reads" your heartbeat and graphs it as a sine curve on screen. It marks the upper, lower, and midpoints with crosses, then calculates your pulse rate. Comparing the pulse rates of people of the same age, people of different ages, and of the same person under different conditions (at rest, while exercising, and just after exercise, for instance) demonstrates to students in a concrete way an important point: the variability of basic heart function.

## SEEING THE UNSEEABLE

One important use of Apple software in the science lab is to show students certain phenomena that are usually hidden. A good example of such a program is **Moving Molecules**, from HRM Software. Showing the motion of molecules isn't easy in the average junior-high science lab. This program can help. By illustrating the behavior of molecules as students type in hypothetical data on varying




*Moving Molecules: Revealing the secrets of molecular activity as physical factors change.*

temperatures, pressures, or states of matter, Moving Molecules makes an important principle of physical science easy to understand.

Simon & Schuster's **Chem Lab** removes the worry of lab safety. Using the Apple as a lab, the student can combine substances to produce various effects. The student manipulates on-screen robot arms, condensers, and bottles of chemicals to perform a variety of experiments. You can't save procedures or data to disk, so students must keep good lab notes (just like real scientists). A mistake means you have to start over.

The lab manual seems to concentrate on mixtures that will explode, but at least it happens only on the computer screen. The practice lesson in the documentation is strange, considering the practicality of the rest of the program—it involves powdered baseball and supernova juice, among other things—but on the whole, the program makes a great lab assistant.

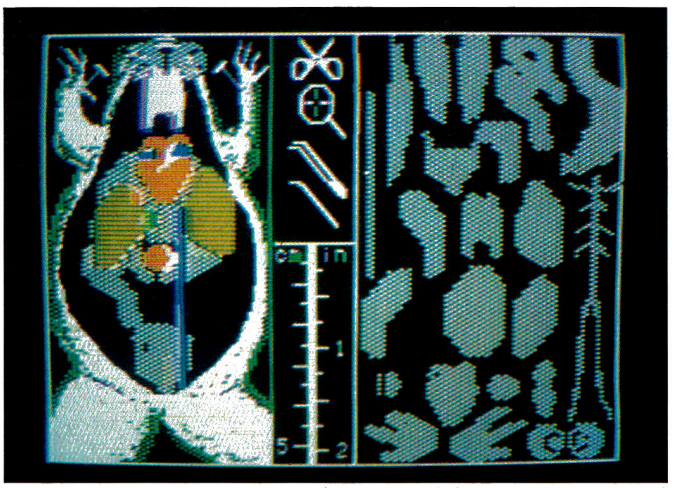
### BLOODLESS DISSECTION

Although there's no substitute for observing actual interior anatomy, dissection of preserved animals in the lab has a few drawbacks—chiefly the smell and the mess and your inability to reverse the process if you make a mistake.

Scholastic's **Operation Frog** alleviates these problems. The student finds on screen all the instruments he or she will need to perform the dissection: scalpel, probes, forceps, and magnifying glass. In addition, the program eliminates some of the inconvenient preliminaries—skin, bone, and all but one sample muscle. Students can observe the way organs operate in a living amphibian, then "remove" them and examine them. The real fun comes at the end: Improving on the scalpel, the software even lets you reassemble the hapless frog.

Although science students have been recording data by hand for years, the Apple's ability to measure large amounts of information, record it, and graph it almost instantaneously makes for more efficient, more accurate results. The drudgery of writing down scores of lab data gives way to analysis and application. After all, that's the whole point of science education—thinking, not just recording: not just compiling facts, but following a thread of inquiry, with facts in hand, toward discovery. ■

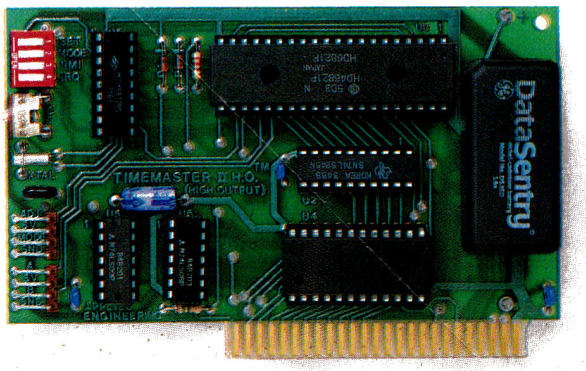
*Kenneth Carlson is a junior-high-school science teacher in the Chicago area. Write to him at 1407 Middletree Road, Joliet, IL 60433.*



*Painless dissection the electronic way, with Scholastic's Operation Frog.*

*Product Information on p. 62*


# The first clock card to add time and date to AppleWorks'™ screens and files.

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| | |
|---|---|
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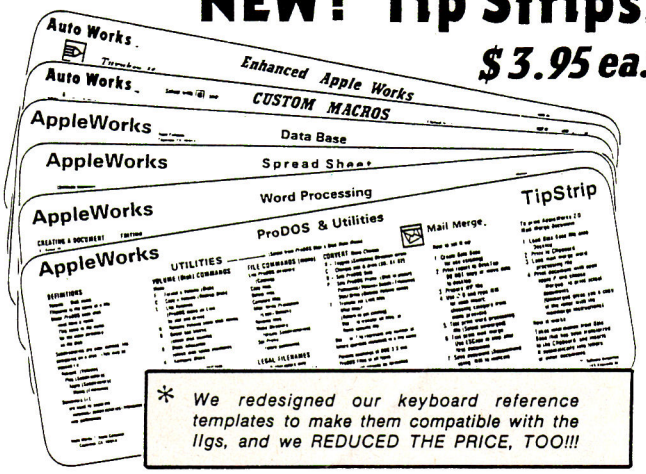


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- **How to predict the "look" of word processor documents.**
- **How to use FontWorks.**
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**Moving Molecules**, $69
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(212) 505-3556
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Broderbund Software
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(415) 479-1170
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$39.95, Speed & Motion
$39.95, Earthquake Lab
$20, teacher guide and backup

**The Temperature Plotter**
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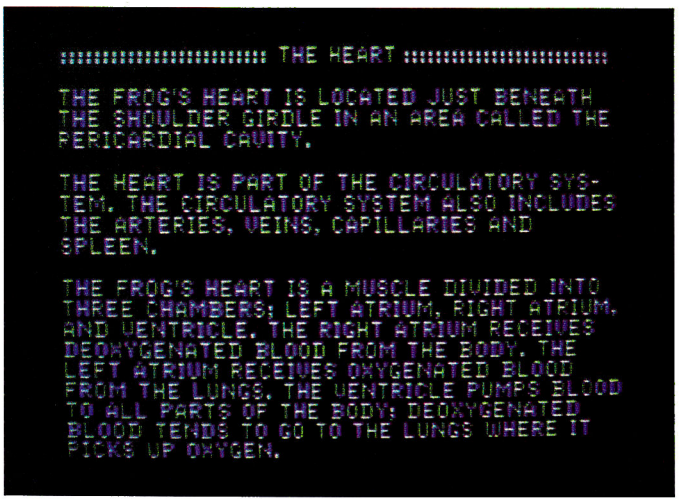
$20, two-probe unassembled
$60, four-probe assembled
$30, four-probe unassembled
$39, manual

**Reader Service Number 318**




*Operation Frog lets students "remove" organs for a closer look and additional text discussion.*

# Z-RAM® gave the IIc guts. Now comes the glory.

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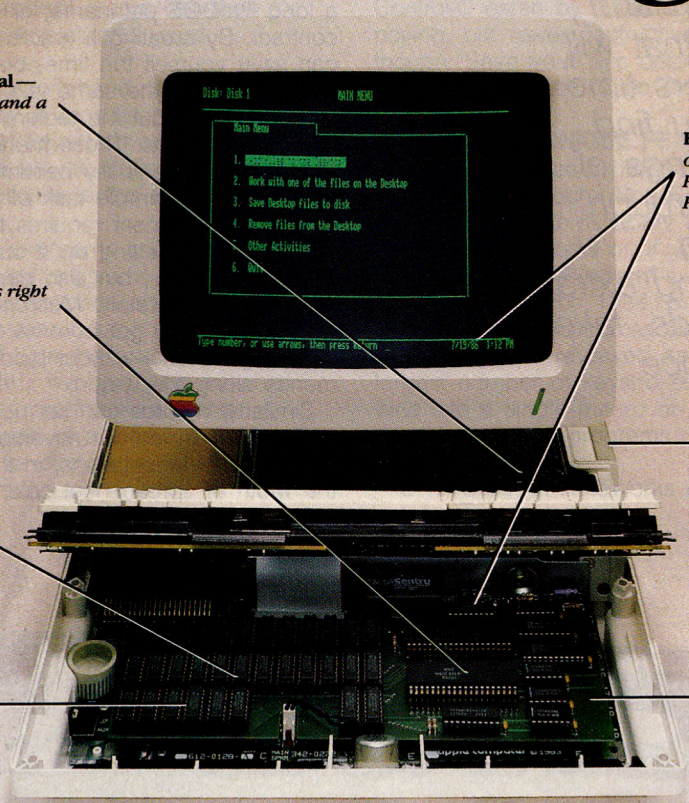


**Real-time clock** *displays time and date on AppleWorks™ screens and files, and is PRO-DOS compatible for use with other PRO-DOS software.*

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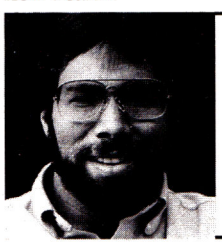

*"I recommend Applied Engineering products wholeheartedly." (Of course, Steve's IIc has a Z-RAM installed.)*

*Steve Wozniak, the creator of Apple Computer*

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# Creating an Electronic Checkbook

*Keep your checkbook in order with a template you construct with the AppleWorks spreadsheet.*

by Ruth K. Witkin

Reconciling your checkbook is virtually guaranteed to make your eyes glaze over. Trying to balance what went in with what went out—and make it agree with your bank statement—is tedious and time-consuming, even when it goes smoothly. And if your numbers are off (shudder), it's pure agony. But there's a better way—the electronic checkbook shown in the accompanying **Figure**.

When you enter your checks and deposits, mark off the transactions shown on the bank statement (by entering ones in columns F and H), and type in the service charges and credits, this electronic checkbook keeps a running balance, reconciles your checkbook with the bank statement, calculates your maximum and average balances each month, and summarizes your transactions.

## A SPREADSHEET FROM SCRATCH

Use the AppleWorks Startup and Program disks to bring up a new spreadsheet screen. Name this file CHECKBOOK. Follow this summary on your screen to set up the checkbook so that it looks like the one in the **Figure**:

*Long lines*: Type quotation marks first, then use an equal sign to enter a line in row 2, columns A through G, then in columns H through K. Now copy row 2 to the clipboard: Leave your cursor on H2 and press OA-C to bring up the Copy screen. Type **T** to select *To clipboard* and press the return key. With your cursor on row 30, copy the line from the clipboard: Press OA-C and type **F** to select *From clipboard*. Again copy the line from the clipboard to rows 39 and 55.

Next, using a minus sign, enter the line in row 5, columns A through G, then H through K. Copy row 5 to the clipboard, then copy from the clipboard to rows 32 and 42. Now use the Blank command (OA-B) to erase the lines in the block of cells F42 to H57, which produces the amicable separation shown in the **Figure**.

*Column width*: Use the Layout command (OA-L) to change the column width from the current nine characters to the following: Reduce columns A and B by three characters and column C by six characters; increase D by 14 characters and E by one character; reduce F by seven characters; increase G by two characters; reduce H by seven characters; increase I by three characters, and J and K by one character.

*Short lines*: Enter the short lines in E46, E52, J55, and K55. Type quotation marks first, then a minus sign nine times so that the line stops one character shy of the right edge of the cell.

*Labels*: Type the labels shown in the **Figure**. The label *OPENING BALANCE* is in D6, and *CLOSING BALANCE* is in D29, each followed by 32 minus signs and a greater-than sign (>). The label **** Outstanding **** is in J3—first type quotation marks to tell AppleWorks the asterisk is text, then three asterisks, a space, **Outstanding**, another space, and three asterisks. To type the indented labels in rows 44, 45, 50, and 51, first type quotation marks and press the spacebar once.

*Format*: Use the Layout command (OA-L) to center the labels in rows 3, 4, and 31 (columns E through K) and cells J41 to K41. Use the Value command (OA-V) to set a standard-value format of *Commas* with two decimal places. Use OA-L to format the following cells for *Appropriate*: B7 through B39 (check numbers), F7 through F39, and H7 through H39 (ones in columns F and H). Press OA-S to store your spreadsheet on disk.

## ENTERING THE FORMULAS

Let's look now at the formulas that balance your checkbook. First, read how the formula works. Then place your cursor on the cell receiving the formula. Move your cursor to the cell locations shown in the formula description and type everything else. When the formula is complete, press the return key. If you have a problem, press the escape key and start again.

## RUNNING BALANCE

Formula 1 adds a deposit (G7) to, and subtracts a check (E7) from, the opening balance (I6) to start the running balance in I7.

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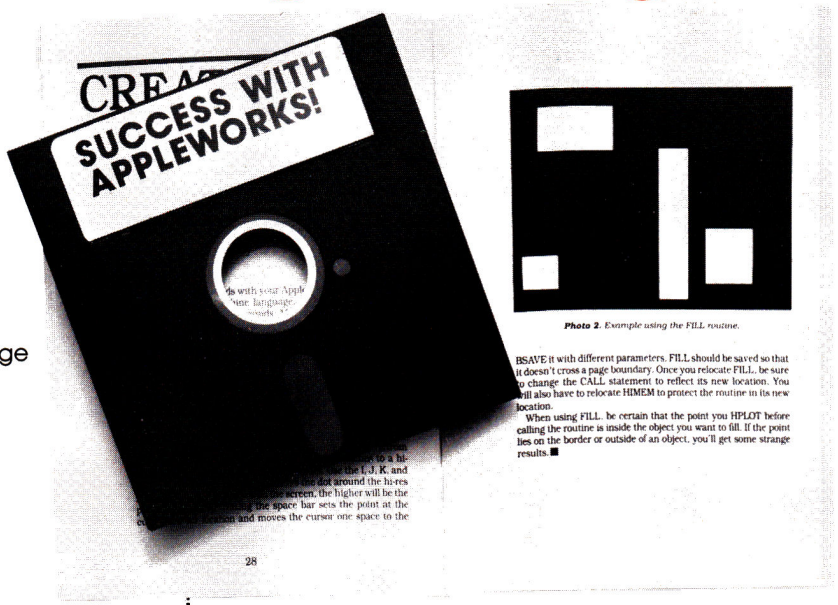


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|---|---|
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# APPLEWORKS IN ACTION

*Figure. The AppleWorks electronic checkbook tracks your financial transactions and reconciles your bank statement.*

Account 42-A-3955 — ELECTRONIC CHECKBOOK

| Date | Check# | Issued To | Check Amount | C | Deposit Amount | D | Balance | *** Outstanding *** Check | Deposit |
|---|---|---|---|---|---|---|---|---|---|
| 1987 | | OPENING BALANCE----------> | | | | | 1,437.78 | | |
| Aug 1 | 423 | Equity Life Insurance | 456.72 | 1 | | | 981.06 | 0.00 | 0.00 |
| Aug 2 | 424 | Blue Star Medical Ins | 189.00 | 1 | | | 792.06 | 0.00 | 0.00 |
| Aug 2 | | Deposit | | | 1,234.56 | 1 | 2,026.62 | 0.00 | 0.00 |
| Aug 2 | 425 | Vistacard | 420.79 | 1 | | | 1,605.83 | 0.00 | 0.00 |
| Aug 2 | 426 | NY State Tax | 62.00 | 1 | | | 1,543.83 | 0.00 | 0.00 |
| Aug 5 | | Deposit | | | 478.76 | 1 | 2,022.59 | 0.00 | 0.00 |
| Aug 12 | 427 | Westwind Oil Co | 126.34 | 1 | | | 1,896.25 | 0.00 | 0.00 |
| Aug 19 | 428 | VOID | | | | | 1,896.25 | 0.00 | 0.00 |
| Aug 19 | 429 | Shoreline Trust | 668.00 | 1 | | | 1,228.25 | 0.00 | 0.00 |
| Aug 27 | 430 | Gotham Computer Center | 336.76 | 1 | | | 891.49 | 0.00 | 0.00 |
| Aug 27 | | Deposit | | | 1,234.56 | 1 | 2,126.05 | 0.00 | 0.00 |
| Aug 27 | 431 | Abner Supermarket | 96.23 | | | | 2,029.82 | 96.23 | 0.00 |
| Aug 27 | 432 | inCider Magazine | 38.00 | | | | 1,991.82 | 38.00 | 0.00 |
| Sep 2 | 433 | The Nissen Group | 350.00 | 1 | | | 1,641.82 | 0.00 | 0.00 |
| Sep 3 | | Deposit | | | 25.00 | | 1,666.82 | 0.00 | 25.00 |
| Sep 3 | 434 | Karen Wennerstrom | 86.00 | | | | 1,580.82 | 86.00 | 0.00 |
| | | | | | | | 1,580.82 | 0.00 | 0.00 |
| | | | | | | | 1,580.82 | 0.00 | 0.00 |
| | | | | | | | 1,580.82 | 0.00 | 0.00 |
| | | | | | | | 1,580.82 | 0.00 | 0.00 |
| | | | | | | | 1,580.82 | 0.00 | 0.00 |
| | | CLOSING BALANCE----------> | | | | | 1,580.82 | | |

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|---|---|---|---|---|---|---|---|---|
| Jul 23 | 412 | Country Printers | 15.00 | | | | 15.00 | 0.00 |
| Jul 29 | 414 | LI Telephone | 53.43 | 1 | | | 0.00 | 0.00 |
| | | | | | | | 0.00 | 0.00 |
| | | | | | | | 0.00 | 0.00 |
| | | | | | | | 0.00 | 0.00 |
| | | | | | | | 0.00 | 0.00 |
| | | | | | | | 0.00 | 0.00 |

| RECONCILIATION | | Y-T-D | CHECKS | DEPOSITS |
|---|---|---|---|---|
| Checkbook Closing Balance: | 1,580.82 | January | 2,376.44 | 2,570.00 |
| Plus bank credits | 0.00 | February | 1,234.78 | 2,134.00 |
| Less bank charges | 14.00 | March | 2,256.23 | 1,980.00 |
| Adjusted Checkbook Balance | 1,566.82 | April | 2,789.50 | 1,678.90 |
| | | May | 1,987.00 | 2,476.00 |
| Bank Statement Balance: | 1,777.05 | June | 2,133.00 | 2,903.00 |
| Plus deposits in transit | 25.00 | July | 2,345.67 | 3,076.01 |
| Less outstanding checks | 235.23 | August | 2,829.84 | 2,972.88 |
| | | September | | |
| Adjusted Bank Statement Balance | 1,566.82 | October | | |
| Variance (Checkbook minus Statement) | .00 | November | | |
| Maximum Balance During Month | 2,126.05 | December | | |
| Average Balance During Month | 1,601.04 | Totals | 17,952.46 | 19,790.79 |

Cell location: I7
Description: +I6+G7–E7

Now copy Formula 1 down column I: Leave your cursor on I7 and press OA-C to bring up the Copy screen. Press the return key twice to confirm *Within worksheet* and the source. Move the cursor to I8 and type a period to indicate a range of cells. Press OA-5 to highlight I8 to I29, the destination cells, and hit the return key again.

AppleWorks now highlights I6 on the entry line and asks whether I6 is *No change* (an absolute cell reference) or *Relative* in its new locations. Cell I6 is relative, as well as G7 and E7, so type **R** three times.

### OUTSTANDING CHECKS

Formula 2 produces one of two possible answers. The Test statement looks at F7 to see whether you entered a one, indicating a check debited to your account. If F7 contains a one, the Then statement enters a zero in the outstanding-check cell (J7). If F7 is empty, the Else statement copies the amount of the check from E7 to J7.

Cell location: J7
Description: @IF(F7=1,0,E7)

Copy Formula 2 down its column, together with Formula 3, after you enter it.

### OUTSTANDING DEPOSIT

Formula 3 does for deposits what Formula 2 does for checks. If the Test statement finds the number one in H7, the Then statement enters a zero in the outstanding-deposit cell (K7). If H7 is empty, the Else statement copies the amount of the deposit from G7 to K7.

Cell location: K7
Description: @IF(H7=1,0,G7)

Copy Formulas 2 and 3 down the

column: Place your cursor on J7 and press OA-C. Press the return key to confirm *Within worksheet*. Press the right arrow key to highlight J7 and K7, the source, and press the return key. Now press the down arrow key to move the cursor to J8, and type a period. Press OA-5, then up arrow to highlight up to J28 to K28, the destination, and press the return key.

AppleWorks highlights F7 on the entry line and asks whether F7 is *No change* or *Relative*. The cell references in both formulas are relative, so type **R** four times.

Copy Formulas 2 and 3 into the previous period: Leave your cursor on J7. Press OA-C and press the return key. Press the right arrow key to highlight J7 and K7, the source, and press the return key again. Press OA-6, then the up arrow key three times to move the cursor to J33. Type a period. Now press OA-6, then down arrow three times to highlight the cell block from rows 33 to 39, the destination, and press the return key. AppleWorks highlights F7 on the entry line. All four cell references are still relative, so type **R** four times.

### CHECKBOOK CLOSING BALANCE

Formula 4 doesn't calculate anything; it just copies the closing balance from I29 to E43. Press OA-7 to jump the cursor to row 43.

Cell location: E43

Description: +I29

### ADJUSTED CHECKBOOK BALANCE

Formula 5 adds the bank credits (E44) to, and deducts the bank charges (E45) from, the checkbook balance (E43) to produce the adjusted checkbook balance in E47.

Cell location: E47

Description: +E43+E44–E45

Copy Formula 5 to E53 where it can calculate the adjusted bank-statement balance by adding the deposits in transit (E50) to, and subtracting the outstanding checks (E51) from, the bank-statement balance (E49): Leave your cursor on E47, press OA-C, and press Return twice. Now press the down arrow key six times to move the cursor to E53. Press Return. Press **R** (for *Relative*) three times.

### DEPOSITS IN TRANSIT

Formula 6 sums the amounts in column K (rows 7 through 28 and rows 33 through 39) and enters the total outstanding deposits in E50. Apple-


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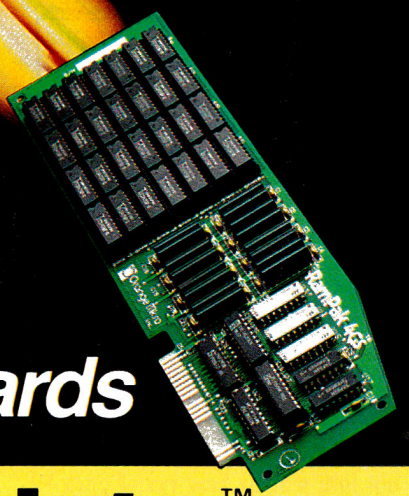

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by Randy Brandt
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*(Version 2.0 requires Super MacroWorks.)*

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–A+ Magazine, October 1986

"What is your FAVORITE Apple II software for 1986?"
1. AppleWorks
2. The Print Shop
3. MACROWORKS
–InCider Magazine's "Reader's Choice" Poll

### MACROWORKS PUTS *YOU* IN CHARGE OF APPLEWORKS

After updating your AppleWorks disk once, you can put the MacroWorks disk away, then use AppleWorks like you always do. MacroWorks remains invisible until you need it. Most new features are accessed using the SOLID-APPLE (🍎) key (or IIGS OPTION key). All standard AppleWorks commands remain in effect.

Here are some of the new features that MacroWorks adds to AppleWorks:

**APPLEWORKS MOUSE CONTROL**
Optionally use your mouse for quick, precise control of menus, scrolling, highlighting, etc.

❑ **CREATE YOUR OWN MACROS**
Convert any series of AppleWorks keystrokes into a new single-keystroke AppleWorks command or "macro." Use our built-in macros or create your own.
For example, 🍎-N could type and center your name and address. Or 🍎-P could print (or save) *all* of your Desktop files, nonstop.
Or you could set up a macro that skips unwanted questions like *"How many copies?"* and *"Are you sure...?"*.

❑ **NEW SINGLE-KEYSTROKE WORD PROCESSOR COMMANDS**
- Character-delete and Word-delete
- Jump to the start or end of a line
- Erase an entire line
- "Undo" the last delete command
- Many more.

❑ **FOR THE WORD PROCESSOR, DATA BASE AND SPREADSHEET**
Create macros for all three applications. For example, in the Spreadsheet, you may find yourself typing the same series of keystrokes every day to sort a column of numbers. Set it up as a one-key macro!

❑ **PERSONALIZED HELP**
Rewrite AppleWorks' "Help" screens to display whatever information you want.

❑ **DESKTOP EXPANDER COMPATIBLE**
Works with the Applied Engineering™ and Checkmate™ Desktop Expanders.

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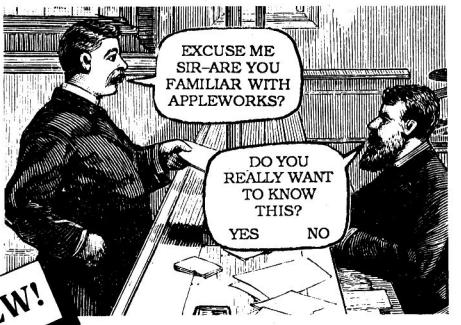


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by Randy Brandt
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*For new AppleWorks version 2.0.*
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Super MacroWorks provides the same AppleWorks enhancements and improvements as MacroWorks (left), **PLUS** the features below.

❑ **AUTO STARTUP**
Boot AppleWorks and it gets itself up and running without another keypress. You can also have any file automatically load, so you're ready to go to work!

❑ **DIRECTORY DATABASE**
Quickly read the file names from any or all of your ProDOS disks into the Data Base. Search and sort by file name, type, date, etc., and make printouts, to see what's *really* in that disk library of yours.

❑ **ON-THE-SPOT COMPILING**
Create and compile new custom macros "live" without leaving AppleWorks.

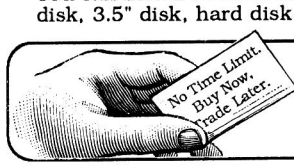
❑ **NO MORE TYPING PATHNAMES!**
When you want to access another disk or directory, you now select from a menu instead of typing a pathname. Simply highlight the directory name you want–it's just like loading files.

❑ **LINKED FILES**
Many possibilities–like the ability to define custom macros that work with a particular file. One keystroke can load a file, then load its associated macros.

❑ **READ-THE-SCREEN MACROS**
Lets you do many things, like convert characters, words or paragraphs from lower-case to UPPER-CASE and back.
And now you can cut and paste *anywhere*, including from field-to-field and record-to-record in the Data Base.

❑ **LOCAL/GLOBAL MACROS**
Define macros that work differently in different applications. For example, you could make 🍎-N do 3 different things:
- Word Processor ..... Type your name
- Spreadsheet ..... Type "3.14159"
- Data Base ..... Sort by Zip code

❑ **TIME & DATE MACROS**
One 🍎-keystroke automatically types the current date or time in any document.




### *Trade Up to SUPER MACROWORKS*

*MacroWorks owners with AppleWorks 2.0 may get a Super MacroWorks trade-in by mailing the front cover of their MacroWorks manual+$22.50 to Beagle Bros. (Calif. add $1.20 tax)*

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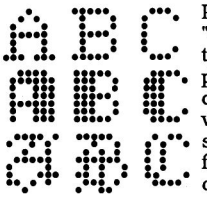


Power Print lets you "download" a second typestyle into your printer's memory so you can alternate printing with your printer's standard font and a new font with special characters and symbols.

**OUR FONTS OR YOURS**
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**APPLEWORKS COMPATIBLE**
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←This logo was actually typed with AppleWorks and printed on an Apple ImageWriter. Other software and printers work equally well.

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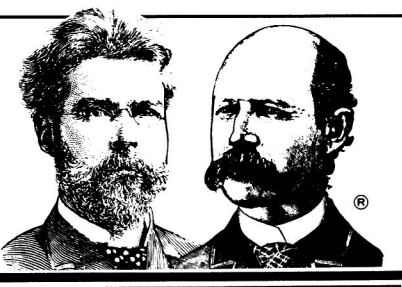

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AD #361

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Works converts the one period you type in the formula to three periods.

Cell location: E50
Description: @SUM(K7.K39)

**OUTSTANDING CHECKS**

Formula 7 sums the amounts in column J (rows 7 through 28 and rows 33 through 39) and enters the total outstanding checks in E51.

Cell location: E51
Description: @SUM(J7.J39)

**VARIANCE (CHECKBOOK MINUS STATEMENT)**

Formula 8 subtracts the adjusted bank statement (E53) from the adjusted checkbook balance (E47) and enters the variance, if any, between these amounts in E54.

Cell location: E54
Description: +E47 – E53

**MAXIMUM BALANCE**

Formula 9 scans the cells in column I (rows 6 through 29) for the largest number—the maximum balance during the month—and enters this amount in E55.

Cell location: E55
Description: @MAX(I29.I6)

**AVERAGE BALANCE**

Formula 10 averages the amounts in column I (rows 6 through 29) and enters the average balance in your checking account in E56.

Cell location: E56
Description: @AVG(I29.I6)

**TOTAL MONTHLY CHECKS**

Formula 11 sums the check amounts in column E (rows 7 through 28) and enters the monthly total in J50.

Cell location: J50
Description: @SUM(E28.E7)

**TOTAL MONTHLY DEPOSITS**

Formula 12 sums the deposits in column G (rows 7 through 28) and enters the monthly total in K50.

Cell location: K50
Description: @SUM(G28.G7)

**TOTALS FOR THE YEAR**

Formula 13 sums the monthly checks in column J (rows 43 through 54) and enters the amount of the total checks written in J56.

Cell location: J56
Description: @SUM(J54.J43)

To produce the total deposits, copy Formula 13 to the right: Leave your cursor on J56, press OA-C, and press Return twice. Press the right arrow key to highlight J56 and K56, and press Return. Cells J54 and J43 are relative references, so type **R** twice. This completes the formulas.

**PROTECTING AND SAVING THE FORMULAS**

Now protect your formulas from accidental change, starting with columns I, J, and K (running balance, outstanding checks, and outstanding deposits). It doesn't matter that you include empty cells, labels, and lines in the group. Press OA-2 to jump the cursor to row 8 and place the cursor on I7. Press OA-L to bring up the Layout screen and type **B** to select *Block*. To highlight the block, press OA-6, press the down arrow key three times, and hit the right arrow key twice. Press the return key and type **PN**.

Next, protect the formulas in column E: Press OA-7 to jump the cursor to row 43 and place the cursor on E43. Press OA-L and press Return to confirm *Entry*. Type **PN**. Repeat these steps for the formula in E47. Now protect the formulas in E50 to E56: Place the cursor on E50 and press OA-L. Type **B** and press OA-9. Press Return and type **PN**.

To protect the formulas in J56 and H57, place your cursor on J56 and press OA-L. Type **B** and move the cursor to K56. Press Return and type **PN**.

And finally, give partial protection to the monthly total formulas: Place the cursor on J50 and press OA-L. Type **B** and move the cursor to K50. Press Return. This time, type **PV** (for *Protection, Values only*). Now store the spreadsheet on disk: Leave your cursor on J50 and press OA-S.

**ENTERING PRACTICE TEXT AND NUMBERS**

The next step is to type in practice entries. To speed up that process, turn off automatic recalculation first: Press OA-V to bring up the Standard Values screen. Type **RF** (*Recalculate Frequency*) and type **M** to select *Manual*.

The **Figure** shows your practice entries. AppleWorks inserts commas and decimal places as needed in the numbers. Press OA-1 to jump the cursor to row 1 and place the cursor on A1. Type **Account 42-A-3955** and move the cursor to A6 (year). Type quotation marks, then **1987** and move the cursor to I6 (opening balance). Type **1437.78** and move the cursor to the next cell containing text or a number. Continue typing and moving the cursor until you've entered the following information:

*Current and previous periods*: Dates in column A, check numbers in column B, payees in column D, check amounts in column E, numeral ones in columns F and H, and deposits in column G.

*Reconciliation*: Bank credits in E44, bank charges in E45, and bank-statement balance in E49.

*Year-to-date*: Checks and deposits in columns J and K. Press Return after the last entry.

Position the spreadsheet where you can see lots of formulas. Now turn on automatic recalculation and watch the formulas go to work: Press OA-V, type **RF** (*Recalculate Frequency*), and press the return key to confirm *Automatic*.

Recalculation was so fast that the formula in E43 didn't have a chance to copy the closing balance from I29, which sometimes happens with AppleWorks. The solution is to calculate again, so press OA-K. Your spreadsheet on screen should now look like the one in the **Figure**.

**PRINTING YOUR SPREADSHEET**

This spreadsheet is 96 characters wide. Use a 12-pitch font to print it on one sheet of 8½-by-11-inch paper: Press OA-O to bring up the Printer Options screen. Type **CI** to select *Chars per Inch* and press the return key. Type **12** and hit the return key again. Press OA-S to save the spreadsheet to disk and return it to the screen.

Now turn on your printer and print the spreadsheet: Press OA-P to bring up the Print screen. Press the return key to confirm *All*. Press the return key to select the printer (or type a printer number, then Return). Type today's date and hit the return key twice, the second time to confirm *one copy*. The printer whirs and here's your spreadsheet.

Never one for cliff-hangers, I apologize for this one. You've created a powerful, hardworking spreadsheet. Using it needs more explanation than I have room for in this month's column. Patience, please—I'll continue this discussion next month, followed by a tutorial on the wondrous IF function.■

---

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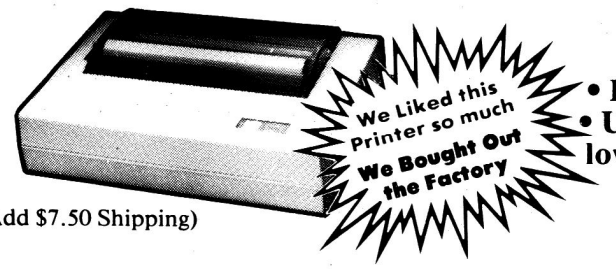


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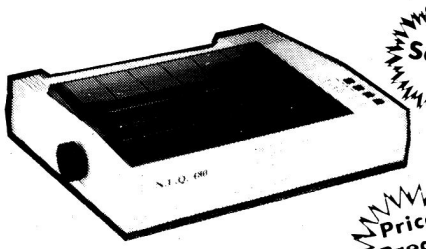


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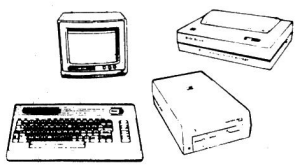


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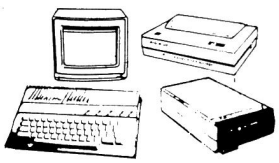


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# Number Formatting in Applesoft

*Use Applesoft's string functions to display numbers in perfect alignment.*

by Dan Bishop

The programmers who gave us Applesoft BASIC left out a command to format and display numbers in neat columns. Some versions of BASIC include such a command. PRINT USING performs this function for the programmer.

The PRINT USING command aligns decimal points even if one of the values is an integer, such as 15, which formatting displays with a decimal point and as many zeros as necessary to fill the field. Used in a loop, the following PRINT USING command formats three columns of numbers rounded to two decimal places to print successive values of X, Y, and Z:

```
PRINT USING "$ ####.## $ ####.##
$ ####.##"; X,Y,Z
```

Unfortunately, formatting isn't so easy in Applesoft BASIC. By default, many Applesoft programmers let numbers print where they may. This results in ragged columns that are difficult to read. Another irritation is the E (exponential) format Applesoft uses for numbers between −0.01 and +0.01. The accompanying **Program listing** is your key to professional-looking output. With this code you can display numbers with decimals aligned and fractions rounded to any number of decimal places you choose.

The subroutine beginning at line 1000 in the **Program listing** formats numbers the way the PRINT USING command does in the example above. Applesoft's STR$ function first converts the numbers to strings. The subroutine then pads them with leading blanks and trailing zeros to achieve the desired format.

The 18 sample numbers in the data statements (lines 500–505) are read into N, a two-dimensional array. The program prints the numbers on screen, three to a row, displaying Applesoft's characteristic lack of column control. The subroutine at line 1000 then formats the numbers to three decimal places, rounded to the nearest thousandth (0.001), and displays them in 13-character-wide columns. You can see at once the difference between formatted and standard Applesoft output.

## THE FORMATTING SUBROUTINE

Line 1002 specifies the total length to be allowed for each number (L% = 13) and the number of digits to the right of the decimal (D% = 3). A subroutine call for line 1000 uses these default values, but you can assign other values to these variables. To do this, assign values to L% and D% before the GOSUB statement in line 230, and enter the subroutine at line 1003:

```
230 D%=2: L%=10: GOSUB 1003
```

As written, the subroutine returns X$ as a 13-character string containing a number rounded to three decimal places, padded with as many leading blanks and trailing zeros as necessary. By choosing an appropriate value for L%, you can include in X$ the blank spaces separating columns of numbers.

To make the subroutine work for all numeric variables in your program, first assign a number to X, the generic variable used in the subprogram (line 220). If the number is represented by TAXTTL, for instance, assign TAXTTL to X. Then use one of the methods described above to call the subroutine, which returns X$. X$ is then used for printing the number (line 240).

Note that the subroutine does nothing to the numeric variable TAXTTL. It converts only one number at a time, which means you have to repeat this process for each number, then print the result, X$, before working on the next number.

## ROUNDING FRACTIONS

Before converting the value in X to a string, the subroutine rounds the number and deletes any unwanted decimal digits. Line 1004 multiplies X by the appropriate power of ten to move all significant digits to the left of the decimal point. For example, to display 25.8356 to two decimal places, multiply X by $10^2$ (100), converting it to 2583.56. The program adds 0.5 to this number, rounding it to 2584.06. Now the INT function chops off the decimal part, and the result, 2584, is divided by the same power of ten used earlier, returning 25.84.

*Program listing. Sample program illustrating a numeric-output-formatting subroutine (lines 1000–1025).*

```
1  REM   NUMERIC OUTPUT FORMATTER
2  REM   SAMPLE PROGRAM BY DAN BISHOP
3  REM   APPLESOFT ADVISOR, INCIDER
4  REM   AUGUST, 1987
9  REM   READ DATA INTO ARRAY N
10 ROW = 6
20 COL = 3
30  DIM N(ROW,COL)
40  FOR I = 1 TO ROW
50  FOR J = 1 TO COL
60  READ N(I,J)
70  NEXT J
80  NEXT I
89  REM  PRINT DATA WITH NO FORMATTING
90  HOME : PRINT "     UNFORMATTED DATA:": PRINT
100  FOR I = 1 TO ROW
110  FOR J = 1 TO COL
120  PRINT N(I,J);"     ";
130  NEXT J
140  PRINT
150  NEXT I
160  PRINT "     ======================"
169  REM  DISPLAY DATA USING FORMATTER
170  PRINT "     FORMATTED OUTPUT:"
180  PRINT
200  FOR I = 1 TO ROW
210  FOR J = 1 TO COL
220 X = N(I,J)
230  GOSUB 1000
240  PRINT X$;
250  NEXT J
260  PRINT
270  NEXT I
280  END
500  DATA   1, 467, 28498
501  DATA  27.5, 5, 86428.22
502  DATA  0.00325,0.00324,517.66666
503  DATA  -2.713, -17, -4633.005
504  DATA  -0.001, -298.66666, -387.00005
505  DATA  0, -0, 0.0005
995  REM  ************************
996  REM  NUMERIC FORMAT ROUTINE
997  REM  ************************
1000  REM  SET L% TO TOTAL COLUMN WIDTH (INCLUDING LEFT SPACE
     S)
1001  REM  SET D% TO NUMBER OF FRACTIONAL DECIMAL DIGITS:
1002 L% = 13:D% = 3
1003  REM  ROUND AND TRUNCATE X:
1004 X =  INT (X * 10 ^ D% + .5) /  INT (10 ^ D% + .5)
1005  REM  SET L$ TO SIGN AND NON-FRACTIONAL DIGITS TO LEFT O
     F DECIMAL POINT:
1007 L$ =  CHR$ (32 + 13 * (X < 0)) +  STR$ ( INT ( ABS (X)))

1008  REM  SET X TO DECIMAL FRACTION PART OF NUMBER:
1009 X =  ABS (X) -  INT ( ABS (X)) + 10 ^  - (D% + 1)
1010  REM   ADD +/- 1 TO AVOID EXPONENTIAL FORMATTING:
1011 X =  - (X < 0) + (X > 0) + X
1013  REM  ADD TRAILING ZEROS:
1014 X$ =  MID$ ( STR$ ( ABS (X)) + "00000000",2,D% + 1)
1015  REM  ADD DECIMAL POINT:
1016 R$ = " ": IF D% <  > 0 THEN R$ = "." +  RIGHT$ (X$,D%)
1017  REM  COMBINE L$ WITH R$:
1018 X$ = L$ + R$
1019  REM  ADD COMMA AFTER THOUSANDS
1020  IF  ABS ( VAL (X$)) >  = 1000 THEN X$ =  LEFT$ (X$, LEN
     (L$) - 3) + "," +  RIGHT$ (X$, LEN (R$) + 3)
```

*Listing continued.*

Line 1007 converts the nonfractional part of the rounded value of X to a string and adds either a space (CHR$(32)) or a minus-sign (CHR$(45)) prefix, depending on whether the number is greater or less than zero. The program assigns the result, 25 (prefaced by a space) for the example above, or −11 for −11.912, to L$.

With the nonfractional digits stored safely in L$, line 1009 assigns only the fractional part to X (containing the original number) by subtracting the integer part from the original value. Although X was rounded and truncated, your Apple might represent the value 25.84 as 25.83999999. The program therefore adds a small value, calculated to be one decimal place less than the last significant digit (ten raised to the −(D%+1) power). What we have to go through to keep the computer honest!

## EXPONENTIAL NOTATION

Apples have a disconcerting habit of converting values less than ABS(.01) to exponential notation. For example, Applesoft displays 0.00313 as 3.13E−03, which plays havoc with simple string conversions. To force the Apple to represent X in standard decimal terms, line 1011 adds +1 if X is positive, or −1 if X is negative. The program removes the +1 (or −1) when it's finished converting.

Line 1014 converts X to a string, adds trailing zeros, and lops the +1 or −1 off the beginning of the string, leaving just the decimal point, fractional digits, and the appropriate number of trailing zeros needed to satisfy D%.

Line 1016 assigns the decimal point and digits from X$ to R$. Line 1018 then gives X$ the combined value of L$ and R$. The original number represented by X is now in string form.

## OTHER FORMATTING TRICKS

If you're formatting numbers greater than 1000, you may want to add commas to mark the thousand and million positions (handled by lines 1020 and 1022). If you don't want to use commas, leave lines 1019–1022 out of your program.

Line 1024 (which contains 20 spaces between the quote marks) uses Applesoft's RIGHT$ function to pad the beginning of the number so that it has exactly the number of

*Listing continued.*

```
1021  REM  ADD COMMA AFTER MILLIONS
1022  IF  ABS ( VAL (X$)) >  = 1000 THEN X$ =  LEFT$ (X$, LEN
     (L$) - 6) + "," +  RIGHT$ (X$, LEN (R$) + 7)
1023  REM  PAD X$ ON LEFT WITH BLANKS
1024 X$ =  RIGHT$ ("                    " + X$,L%)
1025  RETURN
```

*End of listing.*

characters L% calls for. Line 1025 returns X$ to line 240 for printing.

To get a better idea of how this subroutine affects numeric displays, substitute your own data for those in lines 500–505. You can add more data lines and arrange the data any way you like. Be sure to change lines 10 and 20 to indicate the number of rows and columns you want. For example, if your data statements contain 40 numbers, be sure the product of the numbers in lines 10 and 20 equals 40.

You can also change the values in line 1002 to display your data in any format. Because line 1024 uses 20 blanks for padding, the maximum value for L% is also 20. Since eight zeros are added for padding after X, the maximum value for D% is eight. Be sure the value you use for L% is larger than that for D%, enough to handle all the values your data contain.

The program doesn't test whether a value you want to print is too large for your field specifications. Instead, it simply chops off digits to fit the specifications. If that presents a problem for the data set you want to print, you can program the subroutine to substitute a row of asterisks for the number. The asterisks indicate missing digits and help avoid printing output that's clearly wrong. Line 1012 adds this feature to your program:

```
1012  IF LEN(L$) + 1 + D% > L% THEN
      X$ = LEFT$("*********",D% + 2):
      GOTO 1024
```

## CONCLUSION

The subroutine in this program works well for numbers you're likely to use in everyday life. It doesn't include the additional code required to format very large numbers, which the Apple expresses in exponential format. For standard applications, though, this subroutine can spruce up your screen displays and printed documents effectively. If you're tired of hearing complaints about Apple output, you now have the key to producing professional-looking reports.■

*Write to Dan Bishop at 4124 Beaver Creek Drive, Fort Collins, CO 80526.*


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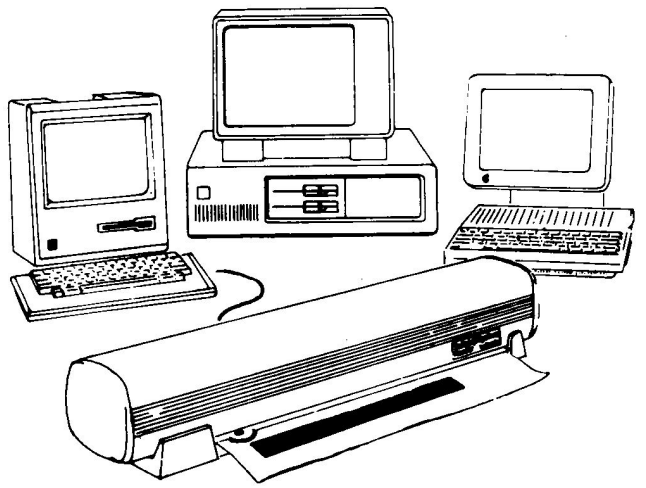

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# Dithering Heights

*Dithering lets you paint up to 16 colors in the GS' super-high-resolution graphics mode.*

by Tom Swan

To *dither*, the dictionary tells us, is to tremble or shiver; as a noun, it's a state of excitement or agitation. In traditional computer graphics, dithering is the process of adding visual "noise" to enhance display quality by breaking up the contours of images—in a sense, exciting or agitating them—to make them look better. If you have a copy of the classic Apple II Slide Show program, you can see examples of dithering in the two slides titled Random Lady and Lady Be Good. Both were created by this method, originally invented at AT&T's Bell Laboratory for the picture phone.

In Apple IIGS super-high-resolution color displays, dithering has a different meaning. Here it's a special graphics technique that lets you paint in up to 16 colors, while the QuickDraw II toolset normally limits you to four. The GS achieves this magic by combining colors in a way that fools you into seeing more hues than are really there, similar to the way traditional dithering adds "noise" to make images appear sharper than normal.

Truly exciting is the purity of these colors, which range from lemon-lemon to orange-orange, plus black, white, and two shades of gray. You give up nothing by dithering, but you gain full-color images in 640-by-200-pixel super-high-resolution mode, an ability normally associated only with 320-by-200-pixel displays. (A *pixel* is a *picture element*—a single dot on the graphics screen.)

## DITHERING IN PASCAL

The accompanying **Program listing** is a simple TML Pascal program that displays 16 dithered color bars. (The rightmost bar is white, the same color as the window's background. You can't see it.) Type in the program with the ORCA/M text editor (from ByteWorks, 4700 Irving Boulevard N.W., Suite 207, Albuquerque, NM 87114, 505-898-8183) or Apple Programmer's Workshop (Apple Programmer Developers Association, 290 S.W. 43rd Street, Renton, WA 98055, 206-251-6548) and save it as DITHER.PAS. Quit the editor and use these commands to compile, link, and run the test:

```
COMPILE DITHER.PAS
LINK DITHER KEEP = DITHER
DITHER
```

On screen, each color bar is the result of various color combinations stored in 16 in-memory palettes, which specify levels of red, green, and blue (RGB) for display pixels. QuickDraw II ROM tools use a pen pattern, a group of memory bits that serve as ink, to draw lines and other shapes. Normally, all bits in a pen pattern have the same color. Dithering those bits—setting each bit to a different color according to a preset plan—gives the extra range of colors you see in the example on your screen.

## PLAIN-VANILLA WINDOWS

The **Program listing** uses TML Pascal's plain-vanilla window, which operates much like a computer-dumb terminal. Inside the window, you can write up to 79 columns by 20 rows of text along with dithered color graphics. **Table 1** lists a subset of TML's other plain-vanilla commands. If you're familiar with Apple Pascal, you'll recognize some of these as old friends. To use the commands, start your own programs with these two lines:

```
PROGRAM Demo( input, output );
USES ConsoleIO, QDIntf;
```

Replace Demo with your program name. The words *input* and *output* in parentheses tell Pascal to use its plain window for all Read, ReadLn, Write, and WriteLn statements. The USES declaration adds the commands in **Table 1** (ConsoleIO) and includes the interface to the GS QuickDraw II toolset (QDIntf).

Next, choose dithered colors from **Table 2** and pass them to tool SetDithColor. Then draw lines with MoveTo, Line, and LineTo statements. MoveTo places an imaginary pen at any display coordinate. Line moves the pen horizontally or vertically to draw a line. LineTo draws lines to specific coordinates, starting at the pen location. In all of these commands, the horizontal value precedes the vertical in parentheses. For example, to draw an orange box, add the following code to the previous two Pascal lines:

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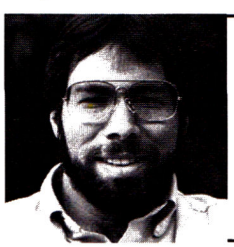

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***Program listing.*** *Demonstration of dithering to display 16 colors.*

```
PROGRAM Dither( input, output );

{ Example of using dithering to display 16 colors
  in 640x200 resolution.  GS TML Pascal.  By Tom Swan.
  Please give this program away. }

USES ConsoleIO, QDIntf;

VAR
   color : INTEGER;

PROCEDURE Center( y : INTEGER; s : Str255 );

{ Center string s at line y in TML's 78x20 dumb terminal window }

   BEGIN
      GotoXY( 41 - ( Length( s ) DIV 2 ), y );
      Write( s )
   END; { Center }

BEGIN

   HideCursor;

   Center( 2, 'Dithering Demo -- 16 colors in 640x200 resolution' );

   SetPenSize( 10, 10 );
   FOR color := 0 TO 15 DO
   BEGIN
      SetDithColor( color );
      MoveTo( 20 + ( 40 * color ), 30 );
      Line( 0, 120 )
   END; { for }

   Center( 20, 'Press any key to end...' );

   REPEAT
   UNTIL Keypressed    { wait for key press to end }

END.
```

*Table 1. TML Pascal ConsoleIO commands.*

```
FUNCTION KeyPressed : BOOLEAN;
FUNCTION ReadChar : CHAR;
PROCEDURE GotoXY( x, y : INTEGER );
PROCEDURE EraseScreen;
PROCEDURE ClearEOL;
PROCEDURE InsertLine;
PROCEDURE DeleteLine;
PROCEDURE SetDithColor( Color : INTEGER );
```

```
BEGIN
  SetPenSize( 5, 5 );
  SetDithColor( 9 );
  MoveTo( 220, 50 );
  Line( 0, 50 );
  Line( 100, 0 );
  Line( 0, -50 );
  Line( -100, 0 );
  REPEAT UNTIL Keypressed
END.
```

Compile this code the same way you did the **Program listing**, substituting your program name for DITHER. This example sets the pen size to five pixels square and selects color 9 (orange) with SetDithColor. MoveTo places the pen at coordinate (220,50). The four Line statements then draw a box, moving the pen right if the first Line value is positive; left if it's negative; down if the second

*Table 2. Dithered colors.*

| Number | Name |
|---|---|
| 0 | Black |
| 1 | Red |
| 2 | Green |
| 3 | Light Gray |
| 4 | Navy Blue |
| 5 | Magenta |
| 6 | Blue-Green |
| 7 | Lavender |
| 8 | Khaki |
| 9 | Orange |
| 10 | Lime |
| 11 | Yellow |
| 12 | Dark Gray |
| 13 | Pink |
| 14 | Mint Green |
| 15 | White |

# LETTERS

In answer to "GS Gems" (March 1987, p. 78), Donna Steinhorn, from Rumson, New Jersey, writes, "I'm a total computer novice. Please remember that some of us barely know a bit from a byte." Bill Robinson, of Magalia, California, tells me, "Wait, slow down!" And Glenn Sherrill, from Torrey, Utah, comes to my rescue with "At last, someone is starting to demonstrate how to actually write a GS program!"

These and other letters tell me you're a mixed gang—from GS beginner to whiz-kid prodigy. In future columns I'll include more tricks and tips that everyone can use, plus technical information on GS tools for programmers. Please keep writing, and tell me what subjects you'd like me to cover here.

**In your April 1987 column ("Quick-Draw Graphics," p. 82), you gave an example of how to set up a RAM disk [for] the 512K card. Is the concept the same for a 1024K card?**

**Bruce MacLeod**
**San Francisco, CA**

The procedure for setting up a RAM disk is the same, whether your computer has 512K or 8 megabytes of memory. ProDOS expands /RAM5 to accommodate files as you add them, similar to a thermometer that records the high temperature—the marker goes up but not down. The only way to reduce RAM-disk size after expanding it is to turn off your GS, wait 30 seconds, then turn it back on.

**Are BASIC programmers locked out of using the internal routines outlined in your articles?**

**Ronald Kota**
**Oak Ridge, NJ**

At the moment, BASIC programmers aren't getting full measure from their GSs. The only BASIC interpreter available is Applesoft—the same language other Apple IIs use. I expect to eventually see a ProDOS 16 BASIC offering windows, pull-down menus, and full access to the GS toolbox. As soon as such a product is available, I'll cover it here.□ **—T.S.**

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## Sneak Previews

TML Systems (4241 Baymeadows Road, Suite 23, Jacksonville, FL 32217, 904-636-8592) has released the **TML Source Code Library** of 15 examples ($49), which includes all Pascal programming and shows you how to design windows, pull-down menus, and desk accessories. It also shows you how to write programs to display color Paintworks pictures and print text and graphics. If you purchase the library with the **TML Pascal Compiler**, the package is $150. (Alone, the compiler is $125.) Order the package. The examples are worth more than the extra $25.

Apple will soon release a new **GS Finder**—a close cousin to the Macintosh interface—with color icons (pictures representing disk files), a trash can from which you can recover files you throw away accidentally, 640-by-200-dot-resolution windows, and pull-down menus. An interesting feature saves icon colors on disk, letting you paint all your BASIC programs pink paisley or blue spruce. Grouping files by color makes them easier to pick out from a long disk directory. (The colors are dithered, by the way.) When can you get the new Finder? Scuttlebutt whispers September, but don't hold me to it.

You've heard of Diversi-Copy (see Editors' Choice, January 1987, p. 160); now there's **Diversi-Cache** (Diversified Software Research, 34880 Bunker Hill, Farmington, MI 48018, 313-553-9460, $35). A *cache* is an area in memory that remembers disk sectors as programs read them. ProDOS can then retrieve those sectors from cache memory instead of rereading them from disk, making disk-intensive programs run at RAM-disk speed. (Disk writes still occur at normal speed, though.)

You install Diversi-Cache as a desk accessory, replacing the Alternate Display Mode command in the control panel (perhaps not the best idea) and letting you reserve up to 800K for cache memory. The program stays in memory even after rebooting, so you can use it with ProDOS 8, ProDOS 16, Apple Pascal 1.3, and 3½-inch DOS 3.3 replacements such as UniDOS (MicroSparc, 45 Winthrop Street, Concord, MA 01742, 617-371-1660, $29.95). Diversi-Cache is for 3½-inch GS drives only (not UniDisks) and requires a minimum of 512K of memory.□ **—T.S.**

---

value is positive; or up if it's negative. Finally, the REPEAT loop waits for you to press a key, ending the program.

As you can see from this example, dithering and TML's plain-vanilla windows make Pascal programs much shorter and easier to understand. It's a great way to write short examples and "quick-and-dirty" utilities, and it lets you draw full-color dithered graphics in the GS' super-hi-res display. We'll explore dithered graphics again in the months to come.■

*Tom Swan is the author of* Pascal Programs for Data Base Management *and* Mastering Turbo Pascal, *published by Howard W. Sams. Write to Tom at P.O. Box 206, Lititz, PA 17543.*

---

## Tricks, Tips, and Tidbits

Try this: From the Launcher, open BASIC.SYSTEM to start GS Applesoft BASIC. You should see the square-bracket prompt (]). Type CALL -151 to run the monitor. You should now see an asterisk prompt (*). Next, type the following two lines exactly as shown:

```
0=e
FF/1800X
```

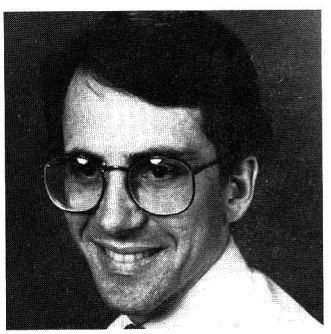
Nothing happens; you just see another asterisk prompt. Type Control-C and press Return to get back to Applesoft. Call up the control panel with Open apple-Control-Escape. Surprise! You now have a new desk accessory called Memory Peeker, a hidden ROM tool Apple doesn't publicize widely. When you select and open the Memory Peeker from the control panel, the following command menu appears:

```
U=Used list P=Purge list F=Free list
Q=Quit
```

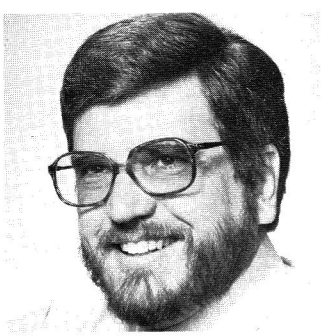
Type U to see a list of memory blocks now in use; P for a similar list of purged blocks, those that programs mark reusable; F for a list of free blocks; or Q to quit. Listed with each block is its *handle* (a form of memory addressing that locates objects even after they move to make room for other data), attribute, ID number, size in bytes, and linking information. Programmers use these lists to debug a program's memory usage. Even if you have no such need, isn't it nice to get something free for a change?□ **—T.S.**

# Tracking Real-Life Expenses

*Teach your students about home finance with this AppleWorks budget simulation.*



by David Goodrum



and Joel Robbins

Classes that give students strategies for dealing with the practical, day-to-day aspects of adult life usually include units on facing economic realities. While you confront your students with the facts (there are always too little money and too many surprises), you can show them that the AppleWorks spreadsheet can keep track of their budgets as they play the real-life game of juggling small paychecks and big bills.

Let's start with a bare-bones template for tracking daily expenses that's simple for students to set up and use in a family-living simulation. Then you can add checkbook-balancing and bank-statement reconciliation functions to make this template powerful enough for your "real" home expenditures.

## SETTING UP THE BUDGET TEMPLATE

From the AppleWorks main menu, open a spreadsheet file from scratch and call it BUDGET. With your cursor in column A, format the column widths with the OA-L (layout) command. Choose *columns*, highlight column A, and press Return. Now choose *column width* and press Return. Use OA-left arrow to reduce the column width by seven characters, then press Return. Use a similar procedure to reduce columns B and K by eight characters each and columns C through J by one character each.

Refer to **Figure 1** and follow these steps to add the template lines:

1) With your cursor in cell A4, press the shift-" key combination, then hold down the dash (–) key to form a line all the way across the screen.

2) Add another line across the screen from cell A36, another from A40 through column I, and a line of equal (=) signs from cell A42 through column I.

3) Place your cursor in cell B3 and again press the shift-" key combination. Press the vertical-bar (|) key once and press Return. To copy this line down the column, leave your cursor in cell B3, press OA-C, choose *within worksheet*, and press Return to highlight the vertical bar as the source. Now type a period to start the range, use the down arrow to highlight the cells through B39, and press Return.

4) Use a similar procedure to create a line in column K or copy the entire line at one time.

Before you insert formulas or numbers, press OA-V to change the standard values for calculation, then choose *recalculate*, *frequency*, and *manual*. Press OA-V again and choose *recalculate*, *order*, and *rows*. Change the standard value for labels: Press OA-V and choose *label format* and *right justify*.

Enter the labels and numbered dates in column A. Type in the labels through column I for rows 1, 2, and 3. Enter the words TOTAL=, BUDGET=, and DIFF: in row 41 as shown in **Figure 1**. Leave column J blank for now.

To keep the dates in their current integer format, place your cursor in cell A5, press OA-L, and choose *block*. Use the down-arrow key to highlight the dates and press Return. Then choose *value format*, *fixed*, and zero decimal places.

Most of the numbers you'll enter are dollars-and-cents values, so you can set standard values. Press OA-V, choose *value format* and *fixed*, and specify two decimal places.

## ENTERING THE FORMULAS

**Table 1** lists the formulas with their functions and the cells into which you type them. Enter the formulas, then follow these steps to copy the formulas in cells C37 and C39 across the template:

1) Place your cursor in cell C37, press OA-C, and choose *within worksheet*.

2) Use the down-arrow key to highlight both formulas as the source and press Return.

3) Press the period key to start the range.

4) Use the right-arrow key to highlight this small block through column I and press Return.

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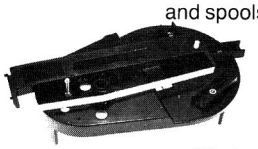

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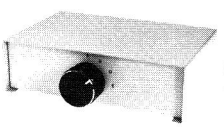

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*Figure 1. BUDGET template.*

```
====A=B===C=======D=======E=======F=======G=======H=======I====
  1|JUL  BUDGET                                        RENT
  2|                                                UTIL's &
  3|DT|  GROCERY HOUSHLD     CARS CONTRIB MEDICAL  INSURE     MISC
  4|--|-------------------------------------------------------------
  5|  1|   -65.25
  6|  2|                   -15.00
  7|  3|
  8|  4|                                         -500.00
  9|  5|                            -20.00
 10|  6|                                    -25.47
 11|  7|           -17.50
 12|  8|
 13|  9|                                         -120.00
 14|10|
 15|11|   -73.25
 16|12|
 17|13|
 18|14|
 19|15|
 20|16|

/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/

 35|31|
 36|--|-------------------------------------------------------------
 37|ST|  138.50   17.50   15.00   20.00   25.47  620.00    0.00
 38|BG|  200.00   50.00   50.00   15.00   30.00  650.00   20.00
 39|+-|   61.50   32.50   35.00   -5.00    4.53   30.00   20.00
 40|-------------------------------------------------------------
 41|     TOTAL=  836.47 BUDGET= 1015.00   DIFF:  178.53
 42|=============================================================
```

*Table 1. BUDGET-template formulas.*

| Cell | Formula | Function |
|---|---|---|
| C37 | – @SUM(C4 . . . C36) | Add column amounts, change to + value |
| C39 | (C38 – C37) | Compare expenses to budget |
| D41 | @SUM(C37 . . . I37) | Add total expenses |
| F41 | @SUM(C38 . . . I38) | Add total budgeted amounts |
| H41 | @SUM(C39 . . . I39) | Add over- and under-budget amounts |

5) Press R four times to choose *relative* for all cell references.

When you're finished entering the formulas, place the cursor on row 5. Press OA-T and choose *top* to set off the column descriptions as titles that remain stationary as you scroll down the template. Press OA-S to save the BUDGET template to disk.

To simulate dealing with real expenses, students must make careful decisions, of course, about the budgeted amounts they place in row 38; enter all expenses as negative numbers; use OA-K to calculate frequently; and not spend more money than they have!

## ADDING THE CHECKBOOK REGISTER

You can add modules to the BUDGET template to keep your checkbook straight and reconcile your bank statement every month.

Use the OA-L command to narrow column L by five characters and columns M through P by eight characters each. Extend the dashed lines across the template in rows 4 and 36 through column R. Create vertical lines in columns M and P like the ones in columns B and K.

Type in the rest of the labels for the top rows as shown in **Figure 2**. Enter the check numbers and other codes into column L. Use column N to indicate whether the amount should be included in the checkbook balance and column O to indicate whether the check or deposit has returned on the bank statement. Columns Q and R perform the actual calculations.

Type in the first four formulas in **Table 2**. To copy the formula in cell Q5, place your cursor on that cell and press OA-C. Choose *within worksheet* and press Return to highlight only that cell as the source. Press the period key to start the range. Use the down-arrow key to highlight that column to row 35 and press Return.

*Table 2. CHECKING-template formulas.*

| Cell | Formula | Function |
|---|---|---|
| Q5 | @IF(N5 = 1,@SUM(B5 . . . K5),0) | Check for checkbook code; repeat amount |
| R5 | @IF(O5 = 1,@SUM(B5 . . . K5),0) | Check for statement code; repeat amount |
| Q37 | @SUM(Q4 . . . Q36) | Total checkbook transactions |
| R37 | @SUM(R4 . . . R36) | Total amounts for cleared transactions |
| H50 | (H46 + Q37) | Take old balance and include new transactions |
| G50 | (H46 + R37 – @SUM(D44 . . . D50) – @SUM(F44 . . . F50)) | Take old balance and include this month's cleared transactions and outstanding checks |

Choose *relative* for all cell references. Use the same procedure to copy the formula in cell R5.

*Figure 2. CHECKING-template additions (columns J through R).*

```
=======J====K=L==MNOP====Q========R=====
  1|CASH/FEE
  2|DEPOSITS                AGAINST  AGAINST
  3| INTERST|CK #|Cr| CHECKING STATEMNT
  4|--------|----|--|-----------------
  5|        | 437|11|   -65.25   -65.25
  6|        | CSH|00|     0.00     0.00
  7|  347.00| DEP|11|   347.00   347.00
  8|        | 438|11|  -500.00  -500.00
  9|        | 439|11|   -20.00   -20.00
 10|        | 440|11|   -25.47   -25.47
 11|        | 441|11|   -17.50   -17.50
 12|  -20.00| 442|11|   -20.00   -20.00
 13|        | 443|10|  -120.00     0.00
 14|  -20.00|  AT|11|   -20.00   -20.00
 15|        | 444|10|   -73.25     0.00
 16|  350.00| DEP|11|   350.00   350.00
 17|        |   0|10|     0.00     0.00
 18|        |   0|10|     0.00     0.00
 19|        |   0|10|     0.00     0.00
 20|        |   0|10|     0.00     0.00
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
 35|        |   0|10|     0.00     0.00
 36|-----------------------------
 37|                   -164.47    28.78
```

## SETTING DEFAULTS

Most transactions (such as deposits, payments with checks, writing a check for cash, or using the teller machine) involve the checkbook, so type 1 (one) in cell N5. A pound sign (#) appears in this cell, indicating that AppleWorks tried to display the number to two decimal places; but it wouldn't fit. To change the formatting, leave your cursor in cell N5 and press OA-L. Now choose *entry*, *value format*, *fixed*, and zero decimal places. The number should now be visible.

To copy this value down the column, press OA-C and choose *within worksheet*. Press Return to highlight cell N5 as the source, then press the period key to start the range. Use the down-arrow key to highlight this column to row 35 and press Return. All the highlighted cells should fill with ones.

*Figure 3. CHECKING-template additions (rows 43 through 51).*

```
====A=B===C=======D=======E=======F=======G=======H=======I====
 43|        CK#      OUT      CK#      OUT          LAST CK
 44|        226   -43.00        0                 BOOK BAL
 45|        317    -8.25        0                 --------
 46|          0                 0                   500.00
 47|          0                 0                 ========
 48|          0                 0          STATMNT CURRENT
 49|          0                 0          -------- -------
 50|          0                 0            580.03  335.53
 51|=================================================================
```

Columns N and O work like an on-off switch: A one tells the formula to include the transaction, while a zero tells it not to use the amount. The default for column O, where you indicate whether the transaction has returned on the bank statement, is zero. Use OA-L to change the format and OA-C to copy it down the column as you did for column N. When your statement arrives, change the zero to a one for transactions that have cleared the bank.

The column L default is also zero. Format it (again using OA-L) for no decimal places and copy it down the column. When you enter a check number, the integer formatting stays the same. You can also overwrite the number with a label code for the transactions: DEP for deposit, AT for automatic teller, and CSH for a cash transaction you should include in the budget part of the template, but not in the checking module.

## A FEW MORE ROWS

To finish the CHECKING template, all that's left is to compute the new bankbook balance, leave room for outstanding checks, and try to match the amount on the bank statement.

The remaining two formulas with their cell locations are shown at the bottom of **Table 2**. Notice that cell H46 is left open for the checkbook balance you enter at the beginning of the month. Refer to **Figure 3** and type the labels for row 43. Now type the labels and lines in columns G and H and the line in row 51.

This leaves room to list 14 outstanding checks, deposits, or other bank transactions. The line across row 51 reminds you that these entries shouldn't extend below the row containing the statement formula.

To format defaults for check numbers, enter zeros (formatted for no decimal places) into cells C44 through C50 and E44 through E50. Enter and format one zero, then copy it to the other cells the same way you did to columns L and O.

## TESTING THE TEMPLATE

Since the value format's standard value is two decimal places, all amounts you enter will be in the same dollars-and-cents format. Only the numbers you format separately will be different from this global default.

To test your spreadsheet, first save the blank template with OA-S. Use the sample expenditures listed in **Table 3** to practice using the template and to check or "debug" the formulas. After you enter all sample amounts and recalculate with OA-K, your results should match those shown in **Figures 1**, **2**, and **3**.

Notice that all entries for checks and automatic-teller transactions must begin with a minus (–) sign. Enter all deposits, budget amounts, and the previous bank balance as positive numbers (or without minus signs). When you're satisfied that your template works properly, you can use the

*Table 3. Sample data for BUDGET and CHECKING templates.*

| Date | Check | Amount | Category | Entered in Checkbook | Returned |
|---|---|---|---|---|---|
| Jul 1 | #437 | $ 65.25 | Grocery | Yes | Yes |
| Jul 2 | | $ 15.00 | Cars | No (cash) | |
| Jul 3 | | $347.00 | DEPOSIT | Yes | Yes |
| Jul 4 | #438 | $500.00 | Rent | Yes | Yes |
| Jul 5 | #439 | $ 20.00 | Contrib. | Yes | Yes |
| Jul 6 | #440 | $ 25.47 | Medical | Yes | Yes |
| Jul 7 | #441 | $ 17.50 | Household | Yes | Yes |
| Jul 8 | #442 | $ 20.00 | Ck for Cash | Yes | Yes |
| Jul 9 | #443 | $120.00 | Insurance | Yes | No |
| Jul 10 | | $ 20.00 | Auto Teller | Yes | Yes |
| Jul 11 | #444 | $ 73.25 | Grocery | Yes | No |
| Jul 12 | | $350.00 | DEPOSIT | Yes | Yes |

Beginning checkbook balance: $500.00

Budgeted amounts for categories:

| | |
|---|---|
| Grocery: | $200.00 |
| Household: | $ 50.00 |
| Cars: | $ 50.00 |
| Contributions: | $ 15.00 |
| Medical: | $ 30.00 |
| Rent, Util.: | $650.00 |
| Misc.: | $ 20.00 |
| Outstanding checks: | #226 for $43.00 |
| | #317 for $ 8.25 |

OA-L command to protect the formulas from wayward keystrokes that might go unnoticed.

## CUSTOMIZING

You might want to expand this template if you're using it for real expenses, not just simulated ones. You can insert columns for more categories or add rows for multiple entries per day. Adding columns to the spreadsheet, though, may move other columns, such as those for entering check numbers and the ones and zeros for checkbook and statement, off screen. You can move columns easily around the template without losing their formatting, and adjust the formulas automatically to make sure they perform their jobs accurately.

To move columns L–P to the left of the DAY column, place your cursor in column L and press OA-M. Choose *within worksheet* and *columns*. Use the right-arrow key to highlight columns L–P and press Return. Now move your cursor to column A and press Return.

To insert columns for more categories, place your cursor in the seventh category column (currently labelled MISC), and press OA-I (insert). Choose *columns*, type in the number of columns you want to add, and press Return. Connect the boundary lines and type in the labels. Press OA-C to copy the formulas in rows 37 and 39 that total expenses and compare budgeted amounts. All cell references are *relative*.

Inserting columns at this location adjusts the other formulas to include the additional information, and leaves the setup for the bank and statement balances intact.

## ADDING DAYS

You can take advantage of the AppleWorks clipboard to add multiple entries for any given day. Place your cursor in the row for the day you want to duplicate and press OA-C. Choose *to clipboard* and press Return to copy the highlighted row to the clipboard. Press OA-C again and choose *from clipboard*.

AppleWorks inserts this new row, already formatted and containing the correct formulas, at the cursor location. All the formulas in the template adjust automatically, ready for you to insert another transaction.

A copy of that row is still in the clipboard (unless you used the clipboard for something else) and you can copy it to your worksheet at any time. If you want to insert a row for a different day, you can easily type the new number over the old one.

In the next Teachers' Choice, we'll show you how to use your Apple II and AppleWorks to set up a voting machine.■

*David Goodrum and Joel Robbins are developers of SchoolWorks, AppleWorks templates for education, published by K–12 MicroMedia Publishing, and other educational software. Dave and Joel want to hear about template ideas you'd like to see developed in Teachers' Choice. Write to them at P.O. Box 5545, Bloomington, IN 47402. Enclose a stamped, self-addressed envelope if you want a personal reply.*

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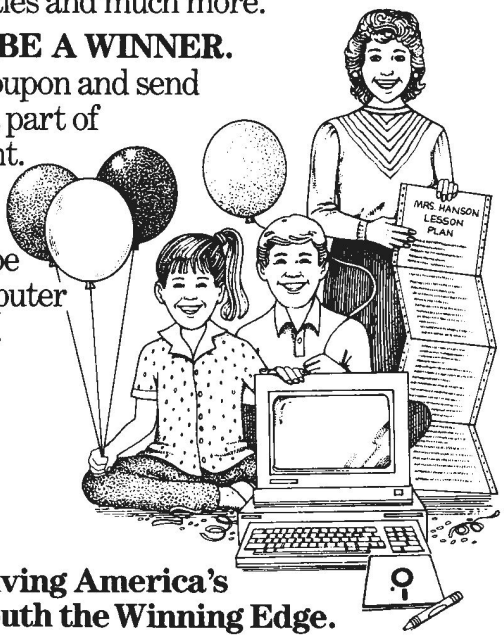


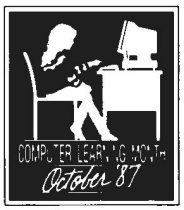


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# REVIEWS

Continued from p. 36

Either way, report construction becomes second nature with a little practice and some trial and error.

Several features of the report generator stand out. Nine to Five assumes the use of 8½-inch paper and automatically converts to condensed type if the report exceeds 80 columns. It can combine data from two fields to form a new field, either alphabetic or numeric—for instance, you can merge "First Name" and "Last Name" to print a full name in a report. It can calculate subtotals at up to three breaks within a report. A Count command counts the records printed, displaying a total at each break or at the end of the report.

Conditional commands let you generate a report in which the program prints certain data only if they match specified conditions you've posted. This functon is so powerful that it can dictate not only which records are printed, but even which paragraphs are printed in a particular letter.

Nine to Five can update records automatically, with special fields taking data already entered and modifying them as you prefer, in either all or selected records. If you'd like to increase the number in a "Cost" field by 10 percent, there's no need to retype each entry—an update field can do the job at the touch of a key. It's as easy as telling the program to SET [Cost] TO [COST * 1.1].

## PROS AND CONS

While remarkably good, Nine to Five isn't perfect. For one thing, it requires a good deal of planning: While editing or renaming fields or changing their data types is easy, it's a chore to actually add or delete fields after you've created a database. You must transfer all your data to a new database containing the new fields.

Also, the program's integrated word processor, while quite functional for simple letter writing, would never make it as a stand-alone program. Even the manual refers to it under the heading "Using the Nine to Five Text Editor."

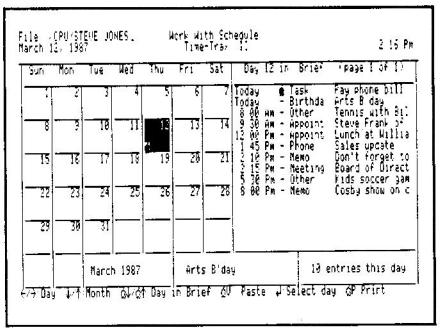
The module's biggest limitation is its skimpy file size—it's good for little more than a two-page letter. While the editing commands it does possess are powerful and easy to use, don't expect to find such standard items as headers, footers, or page numbering.

However, many elements missing in the word processor can be found in the report generator, and it's hard to beat the ease and speed with which the text module links to the database for mail-merge or form-letter work.

The Nine to Five manual isn't the greatest; it could be less ambiguous, with fuller examples and a more complete treatment of report generation. Instead, the manual is more like a tutorial, with the exception of the section on report generation, where a tutorial approach is most needed. It occasionally assumes that you understand more than a novice user should be expected to.

Overall, though, Nine to Five provides a database-management system that's versatile, powerful, and relatively easy to use. It includes numerous features that are lacking in some competitively priced packages, and its word processor, though somewhat underpowered, smoothly integrates report generation and mail merge.■

***James V. Trunzo***
***Leechburg, PA***

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Some people at the office have taken a seminar and are spreading the gospel of time management, and I thought Time-Trax II would help me keep pace. But while Time-Trax II is a great way to use an Apple to manage appointments, it requires a whole computer to itself, a computer running


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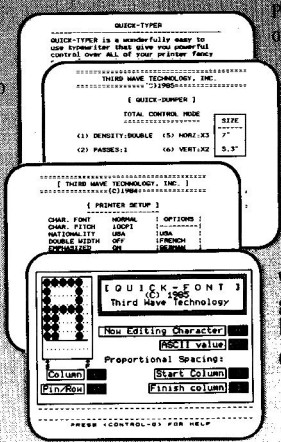


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Pinpoint's desk accessories, or an optional data-bank wristwatch to keep you posted. A pocket record book does the job more efficiently for me.

Time-Trax II looks and feels like AppleWorks, with a main menu listing file-card options such as "add file to desktop," "work with file on the desktop," and "save desktop file to disk." A critical difference, however, is that the Time-Trax desktop can hold only one file at a time. I don't think it's fair to call that a desktop—it's like calling a lone wolf a pack.

## TIME FILES

Each Time-Trax file contains a schedule and two notepads (A and B). A data file holds your schedule for 23 months—the current month and the previous and next 11 months. A full schedule can take as many as 272 ProDOS blocks on a 5¼-inch disk that holds 273; the manual suggests that each user reserve a floppy for his or her personal file.

The copyright notice warns, as is typical of software, that the program is licensed only "for your personal use on a single computer." Four pages later, you read that Time-Trax "keeps schedules for an infinite number of people." It seems to me that keeping schedules for everybody in the world, or even in the office, may be a theoretical possibility, but is probably an illegal one.

The keys to the Time-Trax system are its two calendar pages. The "view calendar" option from the main menu shows a plain calendar, in case you just want to know what day it is; it covers the years from 1983 to 1999, so if you want to know the day of the week for your birthday in 2000 or 1955, you're out of luck.

Choosing "work with schedule" from the "work with file" menu calls the schedule calendar, the one with your appointments, reminders, and important dates. The schedule calendar is wonderfully intuitive: You can move the highlight (usually today) from day to day with the left- and right-arrow keys and from month to month with the up and down arrows. When the desired day is highlighted, just press the Return key to read or write appointments for it.

At this level, Time-Trax departs from the AppleWorks interface—while the screens for adding or editing entries look like AppleWorks screens, the open-apple commands are quite different. For instance, I'm used to AppleWorks' Open apple-F for the Find command, and was disconcerted to find it suddenly deleting a character. This is a mild criticism, intended more as a warning to prospective users.

Each entry listing includes a time, an entry type, a reminder flag, and an importance flag. You type a time (12;30 will work if you're too lazy to hit the shift key for 12:30) and choose AM or PM. (Time-Trax thinks 12 noon is AM and midnight PM, though I think differently.) The entry types are standard labels such as "appointment" or "meeting," but you can make them fit your life better by editing them to "hot date" or "softball practice."

You can flag an event as important, asking to be reminded days, hours, or minutes ahead of time by a subtle beep from your computer. Obviously, this works only when Time-Trax is running, which might seem a drawback to its effectiveness as a time manager. But Time-Trax gets around that limitation by working with the


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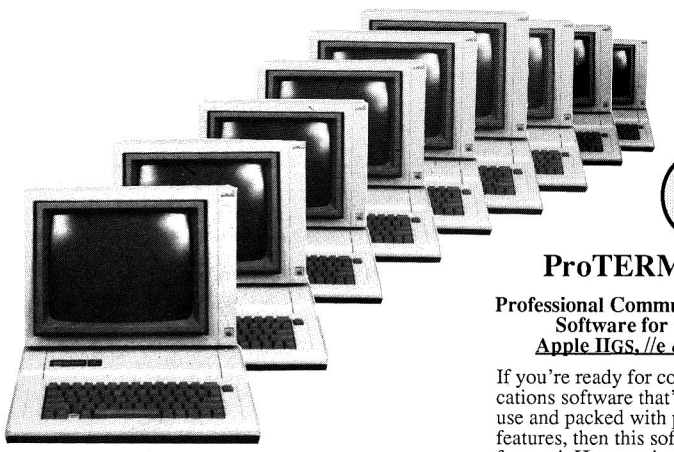

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popular Pinpoint desk accessories, which work with the even more popular AppleWorks (as well as Apple Writer and Word Perfect).

Putting Time-Trax into Pinpoint is no harder or easier than any other Pinpoint installation. After you reconfigure fresh copies of AppleWorks and Pinpoint, Time-Trax becomes an option on the Pinpoint pop-up menu.

If you create an active Time-Trax file containing your schedule, that gentle beep will interrupt you while AppleWorks is running. This is an invaluable feature, though it does require Pinpoint. Also, since Time-Trax is incompatible with certain Pinpoint/hardware/software combinations, I'd look for a dealer who'd let me try Time-Trax with my application and my version of Pinpoint before buying.

Besides the schedule, the other half of a Time-Trax file is the notepad. These two short "word-processor" files look like the event files Time-Trax creates for a schedule, but they lack a time or date. If you're using Time-Trax with Pinpoint, you already have a notepad; the advantage of Time-Trax notepads is apparent only when you use Time-Trax alone, or with the optional Seiko PC Datagraph.

The Datagraph is a nifty digital watch that can read short files from your microcomputer, such as Time-Trax II schedules or notepads, and display them on its face. The watch beeps when an event is coming up, and you can read your shopping list on your wrist, instead of remembering to print it before you leave work. Time-Trax makes it easy to transfer data—easier, in fact, than the software that accompanies the watch when you buy it alone.

If you have Pinpoint and use it all the time, Time-Trax II is an effective time-management tool. If you splurge for the Seiko PC Datagraph, Time-Trax II approaches the level of portability and power I hope future systems will provide: It's almost a handheld computer.

Compared to the program itself, the Time-Trax manual falters. You have to read all the way to chapter 7 to discover that Time-Trax works with Pinpoint, although you learned how to make an active file for Pinpoint in chapter 4. If you have Pinpoint, the first thing you want to know is how to install Time-Trax on it. Words are occasionally misspelled—a small thing, but enough to blur the meaning of a few sentences. The documentation contains a useful index and a toll-free support number, though.

Like all time-management systems, Time-Trax II works only if you use it faithfully. I use AppleWorks a lot, but I take time off for Marble Madness or BASIC programming; a datebook on the desk works better for me. Nevertheless, Time-Trax is a step in the right direction. Time-Trax would be better if it worked with AppleWorks directly; it would be best of all if it hid somewhere in RAM and worked whenever the computer was on, not just during certain applications.■

*Paul Statt*
**inCider** *staff*


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***ABKey***

ABKey teaches children to recognize letters of the alphabet and develop basic keyboard skills. The program includes many levels of challenge and difficulty. Pictures, letters, and synthesized sounds are used in this program. This program is made even more exciting with the use of high resolution color graphics and sound.

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KidsNotes encourages children to have a positive and creative experience with music while learning the basics of musical notation. This introductory music program allows children to explore many aspects of music. Younger children can enjoy playing pre-recorded melodies. They also learn to associate the notes played with the on-screen piano keyboard and musical score. Older children will enjoy composing simple melodies and experimenting with rhythm, pitch, duration, tempo, volume, simple time signatures, and simple key signatures.

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# GAMES EDITORS PLAY

*We admit it: When there's as good a pack of programs as this month's, our game-playing time creeps up from 4:00 on Friday afternoons. Basketball for breakfast, Marble Madness over lunch, Portal at two, hydrofoils for dinner, a little evening comic-book reading, and teddy bears for bedtime? It's a good thing this roundup comes only every other month.*

## *Dan Muse plays...*

**GBA Championship Basketball,** *Gamestar/Activision, 2350 Bayshore Parkway, Mountain View, CA 94043. $39.95.*

There's ten seconds to play in a tie game. Your teammate grabs a rebound and you quickly call time out. Now what? Do you try the last shot yourself, or leave it to your sharp-shooting forward?

GBA Championship Basketball: Two-on-Two adds a new dimension to sports software—a computer-controlled teammate, who seems to have a mind of his own. Before a play begins, you can place your partner high, right, left, or under the basket. He'll stop at that location briefly, but ad-lib from there—he may pass when you want him to shoot, or vice versa.

As with Gamestar Baseball, you'll feel comfortable playing Two-on-Two without too much practice. For example, in my first game with computerized forward Larry Berg, we cruised to an easy 32–20 victory. Larry poured in 18 points; I chipped in with 14 points (and countless assists) from my point-guard position. On the other hand, in our next game, we shot a miserable 29 percent from the floor, were out-rebounded 16 to 6, and lost 36–16.

As heartbreaking as the loss was, that's the beauty of the game. You play a league schedule against 23 teams, each with different strengths and weaknesses. (For example, the high pick that worked so well in the season opener was handled effortlessly by our second opponents.) You have strengths and weaknesses, too, choosing your team's attributes in three categories—inside versus outside, dribbling versus quickness, and stealing versus jumping.

GBA Championship Basketball isn't as slick as Electronic Arts' One-on-One, but a full league schedule, options to set your own abilities, versatile practice sessions—and, most of all, the unpredictability of playing with a teammate who can be as hot or cold as you are—makes this a hard game to pass up.

## *Eric Grevstad plays...*

**Accolade's Comics,** *Accolade Inc., 20833 Stevens Creek Boulevard, Cupertino, CA 95014. $44.95.*

He's a man who leads a life of danger. On every page you turn, his plot gets stranger. With every joke he cracks, another thug attacks. Odds are you'll be playing through tomorrow.

This secret-agent man is Steve Keene, superspy with five lives, star of one of the funniest, most innovative games of the year. Accolade's Comics is an interactive comic book, with two stories told in animated frames. You'll run into constant brief waits for disk access, but it's fun to watch characters move and change expression.

You change the story by choosing among Keene's dialogue balloons, steering him toward a ladder instead of a door, and so on. If you don't kill him off with a wrong move, you'll have to dodge diabolical traps in eight embedded arcade games.

Many dialogue choices don't make a difference in the story, but Keene makes some great wisecracks. Most of the arcade sequences are simple obstacle courses compared to more complex separate games (and require a color monitor to tell safe from lethal places), but they're cleverly animated. The stories are sophomoric, but Steve Keene—facing, among other things, a testy boss, a talking door, an evil ballerina, a killer vacuum cleaner, a giant Girl Scout, snakes, snapping turtles, electric eels, a guard dog, and a starving shark, all in the first half of the first story—is one heck of a hero. This game deserves a sequel.

## *Paul Statt plays...*

**Marble Madness,** *Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. $34.95.*

I hate arcade games. Joysticks bore me. But Marble Madness has a mysterious charm. My first reaction to the bizarre on-screen scene was "It's impossible"—imagine a marble rolling through an M.C. Escher print, with convoluted staircases, arches, ramps, drawbridges, and catapults. Monsters from your worst Freudian nightmares lurk in the halls: snakes, blobs, devilish Slinky toys.

The most impossible aspect of the scene is you—you're the marble. Using the joystick (you can play without a joystick, but it's like playing polo without a horse), you spin, steer, and bounce through six levels of labyrinths. It's not easy. After the first screen, you'll start losing your marbles—monsters munch you, or you tumble into an abyss. Your supply of marbles is endless, but time runs out fast.

The object of the game, they say, is to navigate your way through all six levels. I've discov-

ered four levels, and I disagree: The object of Marble Madness is to play a better game of Marble Madness. You will get better—I promise. The charm of Marble Madness, I guess, is practice.

## *Debbie de Peyster plays...*

**Portal,** *Activision, 2350 Bayshore Parkway, Mountain View, CA 94043. $44.95.*

It's the year 2106. You've just returned to Earth after a 100-year journey into space. But there's no one here to greet you—the countries, the cities, the underground tunnels are deserted. Where is everyone?

That's all I needed to get hooked on Portal, a science-fiction novel in which your sole link to the past is an icon-driven computer terminal. Searching for clues in a network of databases, you slowly piece together the story of what happened to civilization and where the people went. Believe me, you have a long way to go before finding the answers—three double-sided disks, of which I'd used only one after ten hours. (Fortunately, you can save and restore a game in progress.)

Navigating through database levels takes a little getting used to, but it's easy once you get the hang of it. (The on-line help that appears early in the game lays it out for you. You don't have to study documentation, and I like that a lot.) Moving through the different databases, however, is a bit tricky—you can get clearance to certain information only if you proceed in the correct sequence. While each screen gives you a hint of where to go next, I found the *Guide to Portal* cheat sheet extremely helpful. (Get it from Activision for $3.)

I lose myself in the science-fiction world Portal creates, and it keeps me coming back to solve the riddles. If you're curious, and like a good mystery, you'll like Portal, too.

## *Lafe Low plays...*

**PHM Pegasus,** *Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. $34.95.*

Bogies at 11 o'clock—two Nanuchka II missile corvettes, 35 miles and closing. Lock on targets, launch Harpoon missiles. Both targets destroyed, but not until after they've locked on and fired, too. Shift radar to 2.5-mile range for missile tracking. Closing . . . range 1 mile, fire chaff rockets. Enemy missiles successfully deflected. Whew!

That's the sort of stuff that happens when you're at the helm of a Pegasus-class Patrol Hydrofoil Missilecraft (PHM). From your station on the bridge, you'll have a complete view of your ship's controls and the sea before you. (A binocular view zooms in on targets.)

You'll also be able to check your own and other vessels' positions on an operations map, and use one feature the real ship lacks—the ability to speed up time by a factor of up to 128, to race across vast expanses of the Mediterranean or Caribbean, then slow down for combat.

After tackling patrol boats in training exercises, you'll be ready for a mission—hunting terrorists who attacked a seaside resort; dashing south to assist friendly forces; chasing two terrorist missilecraft that attacked an American base on Sicily; escorting a supply convoy through the gauntlet of the Persian Gulf; or secretly photographing supply ships off South America.

Whatever mission you choose, keep your eyes on your radar and be ready to adjust speed, fire cannon, and launch or deflect missiles. When you're foilborne over the ocean at upwards of 50 knots, things happen extremely fast.

## *Ellen Otis plays...*

**Teddy Bear-rels of Fun,** *DLM Teaching Resources, One DLM Park, Allen, TX 75002. $39.95.*

Teddy Bear-rels of Fun, first and foremost, is cute. This Print Shop-style program entertains as well as teaches, offering a variety of images to capture a child's interest.

The program provides an ensemble of teddy-bear characters, which kids can arrange in a variety of settings, such as a beach, sidewalk, or winter scene. Children can choose from a number of props and borders, add their own dialogue or captions, and even insert their own artwork (if they have a graphics tablet or drawing program). After saving it to a data disk, the child can produce his or her creation in pocket or poster size on a dot-matrix printer.

Children (and adults) will smile at artist Polly Brewer's adorable teddy bears, even while learning about spatial and seasonal relationships: To make a realistic picture, you shouldn't have too many bears hovering in midair or snowmen on the beach.

For the most part, Teddy Bear-rels is easy enough for a toddler to use. I stumbled slightly over the trick of using props from both disks (Teddy's Art Shop and Teddy's Library)—you must return to the main menu to switch disks or drives. Also, there's no simple command to abandon or erase a picture; you must go back to the menu and make a new selection from "Get Background."

My biggest complaint, though, is that I couldn't distinguish between some on-screen props without checking the reference guide. (Is that a mitten or an inkwell?) Nevertheless, these weren't unbearable problems, and the enjoyment a youngster will get from the program will most likely result in a big bear hug.□

# NEW PRODUCTS

edited by Lafe Low

## Hardware

*Give your games and music software movie-surround amplification with the Cinema Sound DX-7 stereo system.*

### SOUND SYSTEM

Bring new sound to your music programs or computer games. The Cinema Sound DX-7 **amplified speaker system** features a three-position switch to toggle among standard, music-surround, and movie-surround effects, plus a separate speaker-mounted volume control.

The speakers, cased in black die-cast aluminum, will fit just about anywhere (they measure only 7 by 4½ by 4 inches), and can be connected to your TV, VCR, or stereo as well as your Apple's audio-output port. The DX-7 system sells for $199 from Oceans West, 1160 Mahalo Place, Compton, CA 90220, (213) 638-4732. For more information, circle Reader Service number 360.

### MINI MODEM

The Practical Modem 1200 SA Mini has all the features of a full-sized, Hayes-compatible 300/1200-bps modem, in a more compact, battery- or AC-powered package. This **pocket-sized modem** plugs into your computer through an RS-232 interface, while an RJ-11 interface connects the unit to any modular telephone jack.

The unit features auto-dial/auto-answer capabilities, pulse or tone dialing, semi-permanent storage of up to ten phone numbers, easy menu-driven configuration, and speaker-volume control. The Practical Modem 1200 SA Mini sells for $199 from Practical Peripherals, 31245 La Baya Drive, Westlake Village, CA 91362, (818) 991-8200. For more information, circle Reader Service number 359.

### SOPHISTICATED SALES

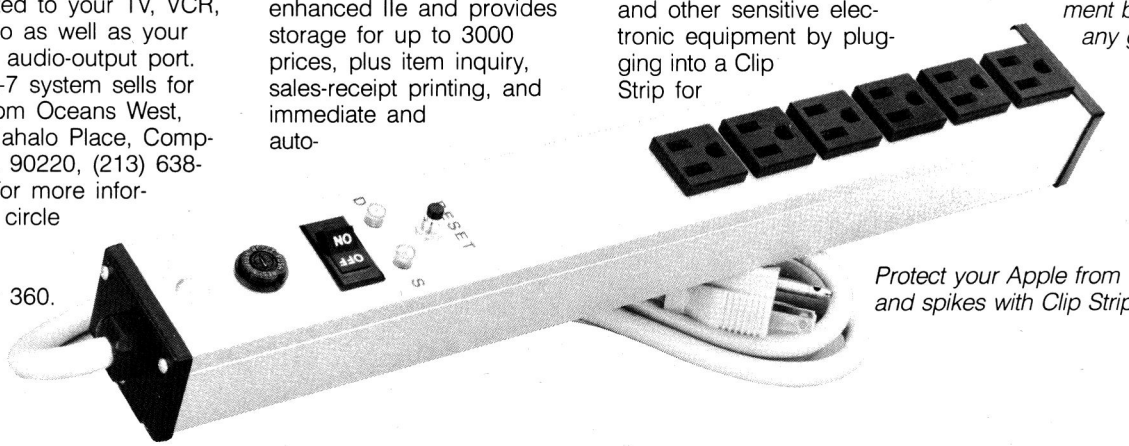
The Retail Supervisor is designed for small- and medium-sized businesses needing an **electronic cash register** and inventory control. The unit connects to your Apple IIc or enhanced IIe and provides storage for up to 3000 prices, plus item inquiry, sales-receipt printing, and immediate and automatic inventory updating as items are sold.

Connect the system to a bar-code reader and you can track items with bar codes and print your own bar-code price labels. The Supervisor automatically reinstates prices following a sale period, and can provide summary and detailed sales reports, analysis and profit reports, and automatic-reorder scan reports to help with inventory forecasting. For more information, contact Abacus Systems, 707 Cass Street, Suite 2, La Crosse, WI 54601, (608) 785-1740, or circle Reader Service number 362.

### EVEN POWER

Doesn't your Apple deserve a **clean power line**? The Clip Strip Dropout Protector prevents damage from voltage fluctuations by shutting off power to all six of its outlets when it senses an unsafe power drop. A three-stage Surge Sentry circuit provides surge protection, responding to spikes in picoseconds (trillionths of a second) to dissipate up to 6000 volts of transient current.

Protect your computer and other sensitive electronic equipment by plugging into a Clip Strip for $139.95 from Dynatech Computer Power, 4744 Scotts Valley Drive, Scotts Valley, CA 95066, (408) 438-5760. For more information, circle Reader Service number 361.

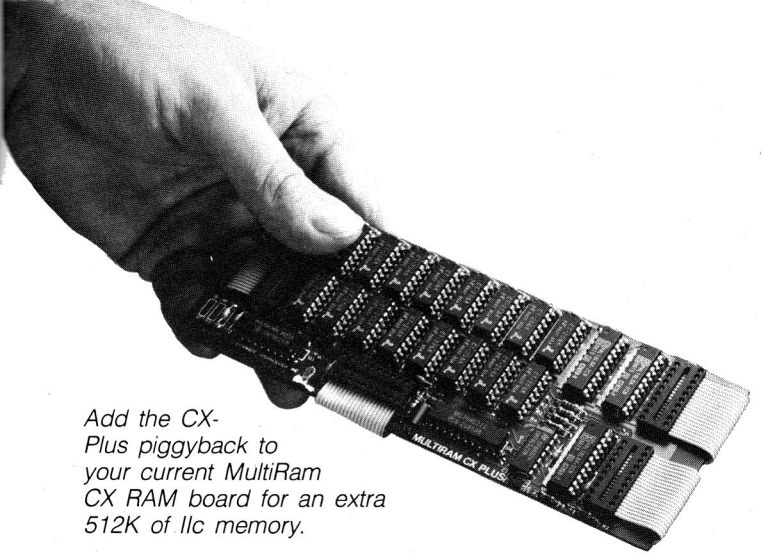



*Protect your Apple from voltage surges and spikes with Clip Strip power outlets.*

### SQUEAKY CLEAN

Keep your mouse running clean by running it through the Mouse Cleaner 360. This system cleans the tracking rollers inside the mouse to eliminate jerky movements and **speed mouse response**. The kit includes a Velcro-covered scrubber ball, scrubber board, lint-free chamois cloth, and a bottle of cleaning solution. The Mouse Cleaner 360 system sells for $16.95 from Ergotron, 1621 East 79th Street, Suite C-133, Bloomington, MN 55420, (612) 854-9116. Circle Reader Service number 358 for more information.

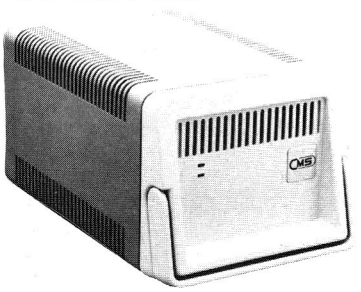
*Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute endorsement by* inCider *of any given product.*




*Add the CX-Plus piggyback to your current MultiRam CX RAM board for an extra 512K of IIc memory.*

## IIc MEMORY

Expand your Apple IIc's memory to **more than 1 megabyte**. The MultiRam CX Plus is a 512K piggyback card you can add to an existing MultiRam CX without any external or internal alterations to your IIc. The CX Plus sells for $244.95 from Checkmate Technology, 509 South Rockford Drive, Tempe, AZ 85281, (602) 966-5802. For more information, circle Reader Service number 357.




*The CMS S-40 external hard-disk drive is one of the fastest Apple drives on the market and features an embedded SCSI controller.*

## QUICK AND COMPACT

The latest **hard-disk drive** from CMS Enhancements, the S-40, uses proprietary technology for a disk-access time of 29 milliseconds. The 40-megabyte, 3½-inch drive also features an embedded SCSI controller, making it directly compatible with the Macintosh Plus or the Apple IIe and IIGS equipped with a SCSI-interface card. The S-40 comes preformatted for quick installation and costs $1995 from CMS Enhancements, 3080-A Airway Avenue, Costa Mesa, CA 92626, (714) 549-9111. Circle Reader Service number 356 for more information.

# Software

## PRINT TRICKS

The makers of Fontrix have a new **desktop-publishing** tool for the Apple II. Printrix can use multiple fonts (more than 180 are available), font enhancements (such as italics, boldface, and magnification), proportional spacing, microjustification, and color to print text files directly from AppleWorks, Apple Writer, and Word Juggler. It can also merge graphics with text; it accepts extended-screen Fontrix Graffiles, hi-res screen graphics, and Print Shop-style clip art.

Printrix runs on the Apple IIe, IIc, and IIGS and supports more than 100 printers and 40 interface cards. With 30 fonts (more are available on Fontpak disks), it sells for $65 from Data Transforms, 616 Washington Street, Denver, CO 80203, (303) 832-1501. For more information, circle Reader Service number 350.

## BITS OF PICTURES

You've seen **clip-art** disks for the IIGS before, but not full-color ones. Activision's new Clip Art Gallery features more than 600 designs you can use with PaintWorks Plus or integrate with GS word-processing documents.

The images in this database of designs are arranged in 24 categories, from business, school, food, and sports to bugs, plants, gadgets, and holidays. With a painting program, you can even alter the images by changing colors and stretching, shrinking, or redrawing parts of pictures. The Clip Art Gallery sells for $29.95 from Activision, 2350 Bayshore Parkway, Mountain View, CA 94043, (415) 960-0410. Circle Reader Service number 354 for more information.

## MENUS MADE EASY

Add **pull-down menus and pop-up windows** to your Pascal programs with the Menus & Windows Toolkit. This developer's package uses precompiled library units to add new commands to Pascal. Simply specify one of several units to add a standard user interface to your programs. The Toolkit is written in Apple Pascal and 6502 assembly language.

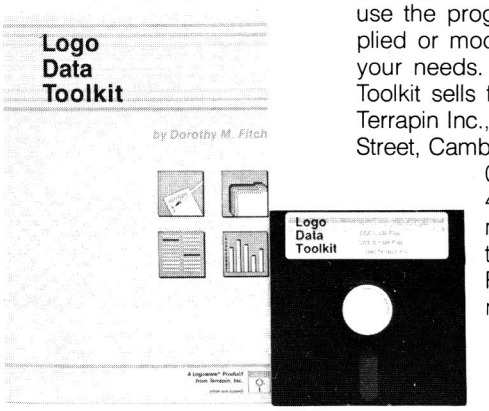
The manual includes examples and the source code for all program modules; developers who use Toolkit routines in commercial programs owe no royalties. Open a window for $39.95 plus $2 shipping and handling, from Swan Software, P.O. Box 206, Lititz, PA 17543, (717) 627-1911. For more information, circle Reader Service number 353.

## TOOLS FOR LOGO

If you use Terrapin Logo in your classroom or home, this new package of applications will help you with **data entry and organization**.

The Logo Data Toolkit contains four programs compatible with Terrapin Logo (version 2.0 or later): a survey tool for creating, modifying, and reporting study results; a database tool for organizing, sorting, and editing information; an association tool for creating quizzes and matching games; and a charts tool for displaying pie, line, and bar graphs.

Each tool also includes printing routines; you can use the programs as supplied or modify them to suit your needs. The Logo Data Toolkit sells for $49.95 from Terrapin Inc., 222 Third Street, Cambridge, MA 02142, (617) 492-8816. For more information, circle Reader Service number 351.




*Four Terrapin-compatible programs—survey statistics, database management, quiz generation, and graphing, with an accompanying print utility—make up the Logo Data Toolkit.*

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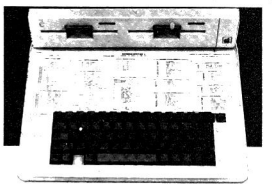

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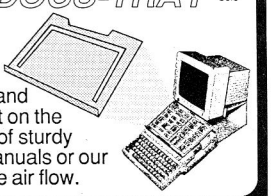

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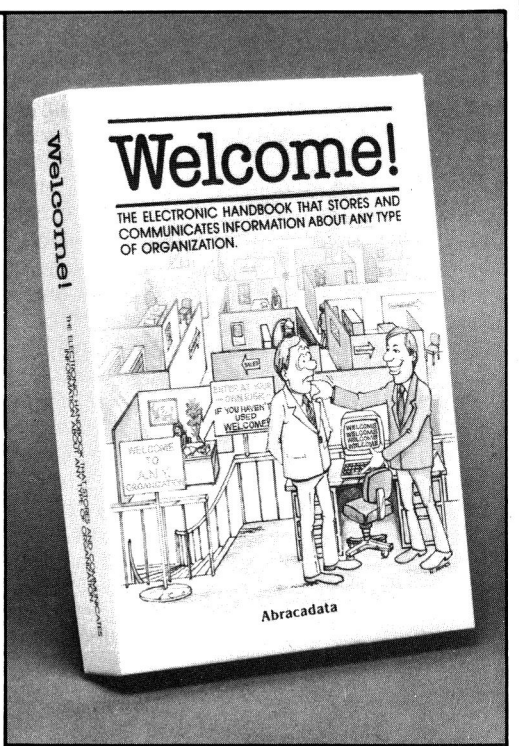


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# NEW PRODUCTS

## Resources

### HOMEWORK BOOKS

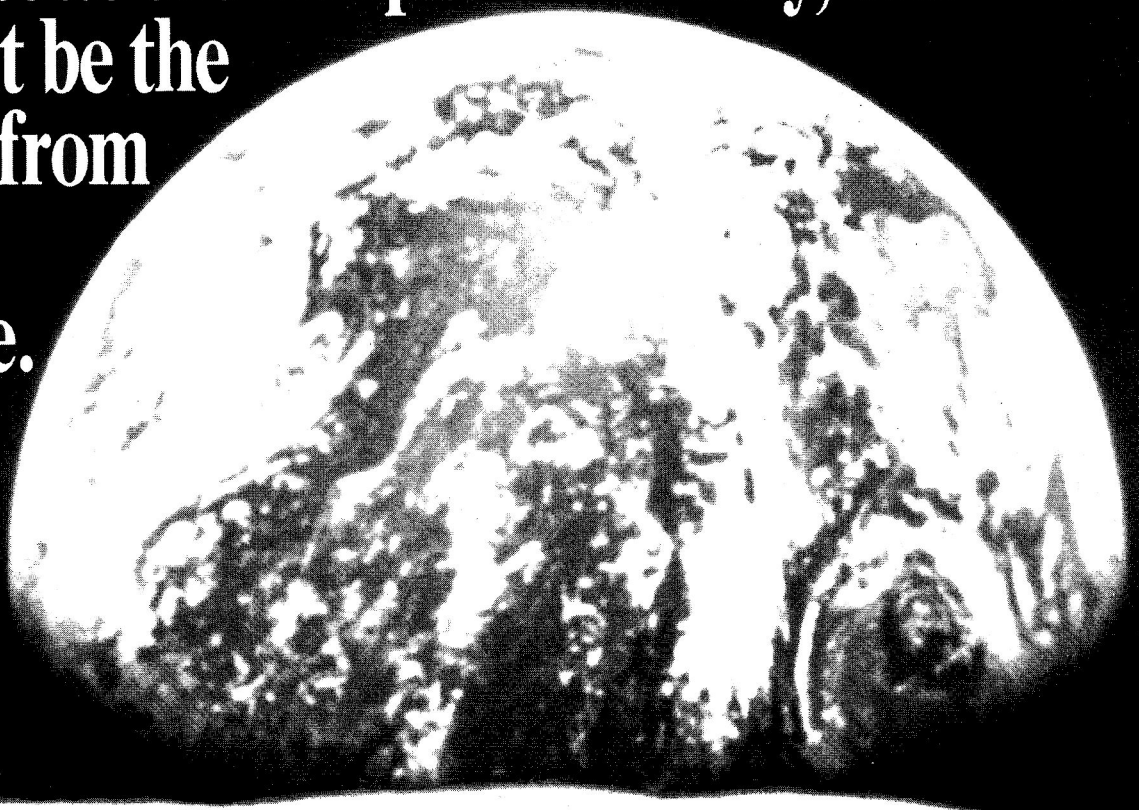
Supplement your children's work with Davidson's Math Blaster and Word Attack programs: This new series of workbooks can be used with the popular software programs or separately at home or in school. Each workbook contains **activities and exercises** designed to build basic skills following three learning steps—tutorial, reinforcement, and application.

Math Blaster workbooks cover grades 1–4 with three workbooks at each grade level; Word Attack books cover grades 2–4, also with three workbooks per grade. For more information, contact Davidson & Associates at 3135 Kashiwa Street, Torrance, CA 90505, (213) 534-4070, or circle Reader Service number 363.

## Product Updates

- Should your Laser need repair, Central Point Software has lowered its price for replacing a **Laser 128 motherboard**. With a trade-in, a new motherboard costs $110 installed. Get in touch with Central Point for details at 9700 S.W. Capitol Highway #100, Portland, OR 97219, (503) 244-5782.
- Apple Computer has enhanced **Instant Pascal**. Version 1.5 of the language supports non-Apple printers, such as Okidata and Epson, and 3½-inch disk drives. It also runs faster, works with hard disks and RAM cards, and is noncopy-protected. The new version sells for $140, but it's free to current owners. Send your proof of purchase and original startup disk to Instant Pascal Upgrade, 450 East Trimble Road, San Jose, CA 95131. Specify whether you want 3½-inch disks, 5¼-inch disks, or both.
- **II in a Mac**, the Apple IIe-emulation program for the Macintosh, has also been upgraded. Version 2.5 is compatible with the Macintosh SE and Mac II with increased performance on the new machines, and features a built-in 65C02 debugging system, new on-line help menu, ProDOS 8, and no copy protection. Registered owners can upgrade by sending $19.95 to Computer:applications, 12813 Lindley Drive, Raleigh, NC 27614, or call (919) 846-1411.
- Logo Computer Systems Incorporated (LCSI) has created new purchasing options for **Logo-Writer**. Previously available only under a site-license agreement, the package can now be purchased in single-disk starter sets for $129 and in six-disk lab packs for $299, both with accompanying support materials. LCSI has also restructured the original site-license agreement, eliminating the annual renewal fee so that a school can make as many copies of Logo-Writer as it needs for the one-time fee of $450. A home-use option ($150) permits duplication of disks for students' use after school. For more details, contact LCSI at 121 Mount Vernon Street, Boston, MA 02108, (617) 742-2990.

# If the space program had advanced as fast as the computer industry, this might be the view from your office.



And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, stood two stories high, covered 15,000 square feet, and cost $486,840.22 in 1946 dollars. Today a $2,000 portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.

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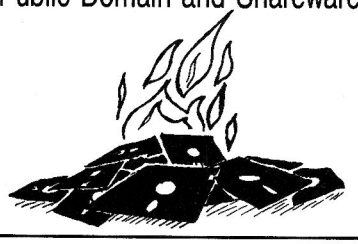

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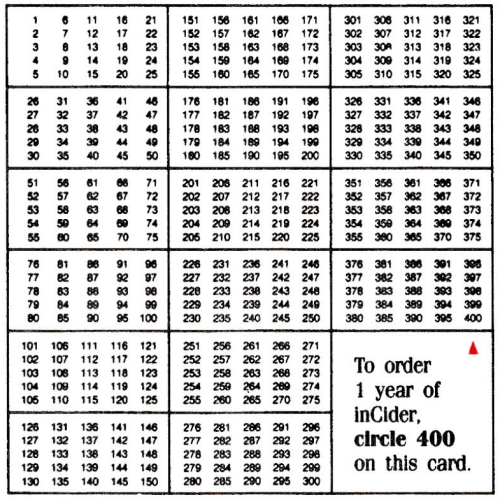


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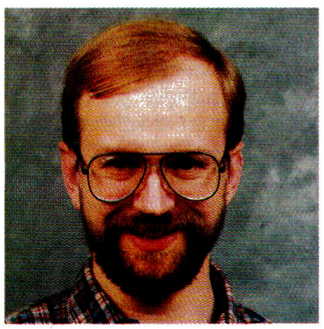
# Sequels: Complexity and Realism



*"I applaud games that demand more from the player than memorization or quick reflexes."*

by Scott Mace

Are fantasy role-playing games getting too hard to play? I love a good challenge as much as anyone, but I wouldn't try to pole-vault competitively until I'd practiced a little.

Most experienced Apple II gamers are playing the latest adventures in the **Wizardry**, **Ultima**, and **The Bard's Tale** series. They're interested in combat-oriented, Dungeons & Dragons-type computer games that aren't for the meek or casual player.

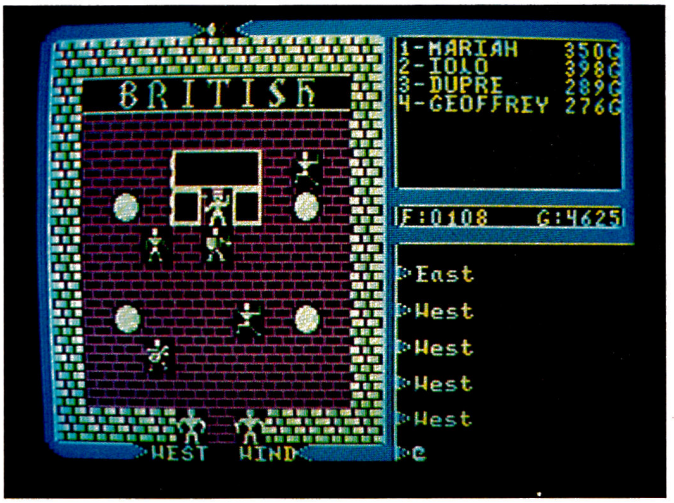
## TRENDS AND PROBLEMS

This genre started out innocently enough. The first of these simulations taxed the Apple II's abilities in an unprecedented way. Bob Woodhead, author of Wizardry (Sir-Tech Software, P.O. Box 245, Ogdensburg, NY 13669, 315-393-6633, $49.95), and Lord British, mastermind of Origin Systems' newly revised Ultima I (136 Harvey Road, Londonderry, NH 03053, 603-644-3360, $39.95), created in just a few hundred kilobytes of code vast catacombs for us to explore.

When Wizardry came out, mere adventure games in which you play a lone explorer were well established. But none offered a multidimensional aspect like that of Wizardry or Ultima, which introduced characters that evolve and mature, hardened by challenge, conquest, and defeat.

Unlike ordinary adventures, these games use an elaborate point system that tells the computer instantly whether a character (usually of a party of six) is a master fighter, an archer, a magus, a wizard, or even a minstrel. You win only by building a balanced party of characters whose abilities complement each other.

So far, so good. I applaud game software that demands more from the player than mere memorization of passageways or quick reflexes. Putting together a team of adventurers lets the player use his or her imagination, perhaps dulled by too many video




*The Destiny Knight (Bard's Tale II) lets you spot a remote enemy and forces you to think strategically.*

games.

But the so-called "sequel" games are the ones that disturb me. Within a given series, each sequel is better than the last, usually because it's more complex. For instance, in **The Bard's Tale II—The Destiny Knight** (Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, 415-571-7171, $44.95), it's possible for a wandering party to spot an enemy brigade from far away. Remote sensing of an enemy mimics life more closely and enables you to think more strategically in the fashion of war games or chess.

Other trends aren't so amusing. In the name of realism, **Phantasie III** (Strategic Simulations, 1046 North Rengstorff Avenue, Mountain View, CA 94043, 415-964-1353, $39.95) lets each character in your party face the possibility of having an arm or a leg injured, or even destroyed. War is hell, and some players want as much realism as possible, but I find it revolting—never mind what some parents would think if they found their kids playing such a game.

We play computer games for two basic reasons. The first is for the challenge. If a game challenges us, and we respond, we grow a bit as individuals. We find we can do things we never thought we could—such as fly a plane or pilot a submarine. The second reason

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**II cue #8**

When you want to load or save standard ASCII text files, the menus within AppleWorks aren't very clear. Notice that you load ASCII files not by "getting a file from disk," but by "making a new file for the desktop." Likewise, to save an ASCII file, don't try to "save desktop files to disk," instead, "*print* a text file on disk." For more information, see "AppleWorks Pie" in the August 1985 ***Open-Apple***, page 1.57.

**From our fan mail:**

I want you to know that I do not understand half of what is written in any of the issues of ***Open-Apple***, but I can remember back when I was taking *Softalk* and didn't understand a nickel's worth of what I was reading in "Beginner's Corner." Anyway, I appreciate and eagerly await each issue of ***Open-Apple*** as I once did issues of *Boy's Life, Colliers* and the *Saturday Evening Post.*

John E. Luther
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# MACE ON GAMES

we play games is to experience what the designer created—a jet, for instance, or a magical kingdom.

## INTERCHANGEABLE CHARACTERS

Game designers assume that most people who finish the first game in a series want the next one to be more difficult. Some games even let you bring characters from an earlier game into the new one. For example, Destiny Knight lets you use characters from The Bard's Tale, or even from Wizardry or Ultima III.

That's a nice feature. But when you bring a character that's fully hardened by previous battles into a new game that's too easy to play, the first half of the game will be a cake walk. Game designers, therefore, make sequels harder to play—but where does that leave those who haven't played previous games in the series?

In The Bard's Tale, novice players spend a lot of time fighting and dying, even failing outright, to attain a bare level of survival. And where are these harder and harder games taking us?

The trouble with playing a series in order might be that newer games represent a better experience, or a better value, than older ones. Ultima I, for instance, contains a fairly small world, while succeeding Ultimas introduce vaster worlds with entire continents to explore.

More players should be able to experience the wonders of these worlds without having to play all the previous games in a series. I realize it's tough—maybe impossible—for game designers to please both novices and experts. Origin's Ultima IV ($59.95), though, does this better than any other game of this kind I've yet seen. Staying alive in Ultima IV is easy to learn, though difficult to master. In The Bard's Tale, however, a party of novices can practically count on being destroyed utterly several times before making significant progress.

## BIGGER AND BETTER

Some new features appearing in these games aren't aimed strictly at gorier battles. The recently released Apple IIGS version of The Bard's Tale adds great digitized sounds, including an eerie Gregorian chant in the temple of healing as your warriors are revived.

Although game authors rarely disclose everything they're planning, I learned that Ultima V will have twice as many different kinds of land "tiles," the grids over which your party journeys, such as mountain, swamp, grassland, and so on. The amount of spoken text will also double, allowing more realistic conversation. Ultima V will also include nightfall, a feature already found in The Bard's Tale.

But the problem of novices' needs versus those of experienced adventurers remains. Should game companies provide characters with more "experience" for those who want them? If I didn't pay my dues in the earlier games, does buying experience so that I can survive in the tougher games make me less of a game player? These adventures have a lot to offer more casual computer gamers as well as pros. Let me know what you think. ■

*Scott Mace is editor and publisher of* Microcosm, *a monthly newsletter on computer games. Write him at 6510 Copper Ridge Drive #T-1, Baltimore, MD 21209.*

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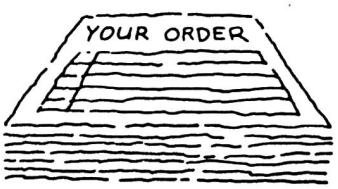


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## AWP-File Reader

*by Harold D. Portnoy*

The program in **Listing 1**, Read AWP, is great for reading an AWP (AppleWorks word-processor) file without having to boot AppleWorks. It's even better when you use it as a subroutine in a BASIC program. For instance, if your program contains instructions, you no longer have to type them as individual string variables. Just type the instructions on AppleWorks and let the subroutine pick them up. (Use this program with RD.FILE from "ProDOS File Reader," to be presented in next month's Hints/Techniques.)

Type a short test AWP file. Include at least three or four sentences in a paragraph, a printer option that's represented by a caret (^) within a sentence, and a printer option that occupies a line by itself (such as Centered or Double Space). Print a hardcopy of the file and save the test file on disk.

Next, BLOAD testfile, A$2000, TAWP. Catalog the disk to obtain the length of your test file. Enter the monitor with CALL -151 and print a hardcopy of the number of bytes in the file starting at $2000. Run your copy of RD.FILE and enter the name of your test file. Now you're ready to analyze an AWP file.

You can ignore the first 300 bytes of this file. The first 2 bytes contain the number of lines in the file, followed by the image of the tab ruler seen at the top of an AWP screen, and information on the cursor's position at the time the file was saved. The remaining bytes are filled with zeros (inverted @ symbols).

*Listing 1. READ.AWP.*

```
10000  REM Read AppleWorks Word Processor File.....by Harold
       D. Portnoy
10010  ONERR  GOTO 10290
10020  PRINT  CHR$ (4)"pr#3"
10030  PRINT "Enter name of AppleWorks Word Processor file
       (<"; PEEK (116) / 4 - 4;"K) ": INPUT "Prefix:/";PX$:
       INPUT "Name:/";AW$
10040  PRINT  CHR$ (4);"Bload /";PX$;"/";AW$;",tawp,
       a$1000,b300"
10050 BL =  PEEK (48858) * 256 +  PEEK (48857): REM ProDOS
       bload length
10060  ONERR  GOTO 10300
10070  PRINT  CHR$ (4);"create /RAM/";AW$;",tawp"
10080  ONERR  GOTO 10290
10090  PRINT  CHR$ (4);"Bsave /RAM/";AW$;",tawp,a$1000,l";BL
10100  HOME : TEXT : VTAB 1: PRINT " AppleWorks Word
       Processor File: ";AW$
10110 HY$ =
"-------------------------------------------------------
--------------------"
10120  PRINT : VTAB 2: PRINT HY$: VTAB 23: PRINT HY$: VTAB 1
10130  PRINT : VTAB 24: PRINT " Control-S: Stop.   Any key:
       Start.   Control-C: End.";: VTAB 1
10140  POKE 34,2: POKE 35,22: VTAB 2: PRINT
10150 P = 512:B = 0: GOSUB 10280: REM  Memory position, load
       byte
10160 A = PEEK  (P + 1): IF A GOTO 10230: REM  Special char
       or line length
10170 LL =  PEEK (P) - 2:TB =  PEEK (P + 2): FOR I = 1 TO 4:
       GOSUB 10260: NEXT : REM    Line length, tab, skip 4
       bytes
10180  PRINT  SPC( TB);: REM  Left margin tab
10190  FOR N = 1 TO LL: REM   Print line
10200 A =  PEEK (P): GOSUB 10260: ON A < 32 GOTO 10220: REM
       Get char, skip if special
10210  PRINT  CHR$ (A);
10220  NEXT : PRINT : GOTO 10160
10230  IF A = 255 THEN  GET A$: GOTO 10290: REM End
10240  IF A = 208 THEN  PRINT : REM  Return
10250  GOSUB 10260: GOSUB 10260: GOTO 10160: REM Skip 2
       bytes
10260  IF P = 711 THEN B = B + 200:P = 512: GOTO 10280: REM
       Get next 200 bytes
10270 P = P + 1:RETURN
10280  PRINT  CHR$ (4)"bload /ram/";AW$;",tawp,a$200,l202,b"
       ;B: RETURN
10290  CALL  - 3288: TEXT : HOME : END
10300  IF  PEEK (222) = 19 THEN  CALL  - 3288: GOTO 10080:
       REM  Duplicate file error
```

*End of listing.*

Look for the first zero between sentences and find the same zero on the monitor hardcopy. The byte to the left of the zero is the number of characters in the next line, minus two. The first byte to the right of the zero is the number of tab spaces to the first character in the next line. The second byte to the right is the number of characters in the next line, unless it's the last line in the paragraph, in which case it indicates the number of characters minus 128 (high byte on). Carets are represented by bytes within a sentence that have a value of less than $20. (For example, $01

represents the Boldface Begin command.)

Now look for bytes with a value of $D0, representing a carriage return. Values greater than $D0 represent printer options on separate lines. Now you have the basics for reading AWP files from BASIC. Refer to the READ.AWP listing if you have any trouble.

The first part of **Listing 1** (lines 10030–10090) transfers the AWP file from disk to /RAM. Placing this part at the beginning of your BASIC program won't wipe out your variables when you BLOAD a long AWP file. The second part (lines 10100–10300) BLOADs your AWP file, 200 bytes at a time, from /RAM into memory-page 2 (the input buffer, unused at this time), then analyzes the bytes as outlined above and prints the characters to the screen.

To copy the program, get out your word processor and type in **Listing 1**. Then save it as a text file. EXEC the text file, and RD.AWP will be saved to disk.■

*Write to Harold Portnoy at 1431 Woodward, Bloomfield Hills, MI 48013.*

## ImageWriter Page Breaks

*by Bob L. Allen*

Ever wish you could get BASIC listings with neat page breaks instead of printing on the perforations? If you have an ImageWriter printer, the short BASIC program presented here will insert page breaks into your printed listings. It sets your printer to type on 60 of the 66 available lines, leaving three blank lines at the top and bottom of each page.

Type in **Listing 2** and save it with the name Control. Line 110 sets the number of printed lines per page (PL) to 60 (though the variable here equals 58), the number of blank lines (BL) to six, and the printer slot (SL) to one. (Change SL to the number of the slot in which your printer is connected if that's not slot 1.) Lines 120–180 let you activate your printer and continue or end the program.

Line 190 sends control to your printer (slot SL). Line 200 sets the top of form (TOF) to the current paper position with Control-]A@. Line 210 generates the number of @@ character sets indicated by PL, telling the printer not to use any special vertical tab stops for that number of lines, but to simply print the lines as requested. Line 220 sets the bottom of form (BOF) with C@.

Line 230 generates the number of @@ character sets for the number of blank spaces indicated by BL. Line 240 sets the TOF of the next page to the current position. Line 250 returns output to the screen (PR#0). The program ends with line 270, which clears Control from memory so that you can load your program for printing.

*Listing 2. Control.*

```
100  REM  * CONTROL
110  PL = 58:BL = 6:SL = 1
120  TEXT : PRINT  CHR$ (21): HOME : INVERSE : HTAB 16: PRINT ":
     CONTROL :": PRINT : NORMAL
130  PRINT "Takes the chaos out of hardcopy listings": PRINT
140  VTAB 6: HTAB 1: PRINT "Please check to see that your printer
     ison line.";: PRINT "  Press return to continue,": PRINT "escape
     to end.";
150  K =  PEEK (49152): IF K < 128 THEN 150
160  POKE 49168,0
170  IF K = 155 THEN 270
180  PRINT "  Working..."
190  PRINT  CHR$ (4);"PR#";SL
200  PRINT  CHR$ (29); CHR$ (65); CHR$ (64);
210  FOR I = 1 TO PL: PRINT  CHR$ (64); CHR$ (64);: NEXT
220  PRINT  CHR$ (67); CHR$ (64);
230  FOR I = 1 TO BL: PRINT  CHR$ (64); CHR$ (64);: NEXT
240  PRINT  CHR$ (65); CHR$ (64); CHR$ (30);
250  PRINT  CHR$ (4);"PR#0"
260  PRINT : PRINT "The printer is now under your control.": PRINT
     "You are free to load and list your": PRINT "program."
270  PRINT : NEW
```

*End of listing.*

### MODIFYING THE PROGRAM

The ImageWriter permits line intervals of six or eight lines per inch. Control is set up for six, but you can easily modify it to allow eight lines per inch. Change PL in line 110 from 58 to 78, and add this line:

```
195 PRINT CHR$(27);CHR$(66);
```

You can even use a different font, such as ultracondensed, by adding the following line:

```
197 PRINT CHR$(27);CHR$(81);
```

### USING CONTROL

When you're ready to use Control, turn on your printer (be sure it's on line), adjust the paper to begin printing three lines below the top (necessary for the first page), and run the program. If you're using ProDOS, type -CONTROL. DOS 3.3 users type RUN CONTROL.

When Control is finished, load your program into memory, type PR#1, press Return, type LIST, press Return again, and *voilà*! Your program is listed with page breaks at the perforations. Run Control before listing your BASIC programs, and you'll get the breaks you deserve.■

*Write to Bob Allen at 27081 Segovia Circle, Mission Viejo, CA 92691.*

## Ampersand Screen Dump

*by Harold D. Portnoy*

Dump is an ampersand-mediated machine-language program (see **Listing 3**) that lets you quickly dump your screen display to your printer. The ampersand command uses the format & [beg],[end]. Unless you specify the beginning and ending lines, the program dumps the entire screen. Enter the command from the keyboard or as part of a BASIC program. Dump works under DOS 3.3 or ProDOS, and with 40- or 80-column screens.

*Listing 3. Dump.*

```
CALL -151
2000:00
2001<2000.21FF
2000:A5 74 38 E9 01 85 74 AE 00 BF E0 4C D0 03 18 69
2010:04 48 85 43 A2 00 8E F6 03 38 68 8D F7 03 E9 21
2020:85 08 20 3C 20 A0 00 A9 21 84 3C 85 3D A0 AA A9
2030:21 84 3E 85 3F A0 00 84 42 4C 2C FE AD 00 BF C9
2040:4C D0 20 A2 00 BD 64 20 9D 33 21 9D 98 21 9D A3
2050:21 E8 E0 06 D0 EF A9 EA 9D 33 21 A9 60 9D 98 21
2060:9D A3 21 60 8C 30 BE 8D 31 BE 00 00 00 00 00 00

2100:20 B7 00 F0 02 D0 0A A9 00 85 06 A9 18 85 07 D0
2110:1E 20 F8 E6 E0 19 B0 14 CA 86 06 20 4C E7 E0 19
2120:B0 0A 86 07 CA E4 06 B0 06 4C C9 DE 4C 99 E1 A0
2130:00 A9 C1 84 36 85 37 20 EA 03 A9 89 20 ED FD A9
2140:B8 20 ED FD A9 B0 20 ED FD A9 CE 20 ED FD A0 00
2150:A6 06 8A 20 C1 FB A5 29 85 3D 85 3F A5 28 85 3C
2160:18 69 27 85 3E 2C 1F C0 10 0B 2C 55 C0 B1 3C 2C
2170:54 C0 20 ED FD B1 3C 20 ED FD 20 BA FC 90 E6 2C
2180:1F C0 30 03 20 8E FD E8 E4 07 90 C6 20 8E FD 2C
2190:1F C0 10 0B A0 07 A9 C3 84 36 85 37 4C EA 03 A0
21A0:F0 A9 FD 84 36 85 37 4C EA 03
BSAVE DUMP ,A8192,L427
3D0G

--------------------------------------------------
ProDOS output hooks. If not using launcher and using
ProDOS, make the following changes:

2133:8C 30 BE 8D 31 BE EA
2198:8C 30 BE 8D 31 BE 60
21A3:8C 30 BE 8D 31 BE 60
```

*End of listing.*

*Listing 4. ADD.DUMP.*

```
0 LOMEM: 5120: REM Prevent over-writing variables.
1 PGND  = PEEK (175) + PEEK (176) * 256: REM Determine
   end of BASIC program.
2 PRINT CHR$(4);"BLOAD DUMP, B 256, A";PGND: REM Load
   binary routine to start at end of BASIC program.
   (Skip DUMP launcher.)
3 LN = 171: REM Length of ML program.
4 PGND = PGND + LN: P2 = INT (PGND/ 256) :POKE 176, P2 :
   P1 = PGND - P2 * 256 : POKE 175, P1 : REM Calculate
   new end of BASIC + binary program and poke into
   program end pointer.
5 END
10 GOSUB 60000: END
60000  BINADR = (PEEK (175) + PEEK (176) * 256) - LN :
   REM find address of beginning of binary routine.
60010  P2 = INT (BINADR/ 256) :POKE 1015, P2 : P1 =
   BINADR - P2 * 256 : POKE 1014, P1: REM point
   ampersand vector to start of binary routine.
60020  RETURN
```

*End of listing.*

*Listing 5. Sample program incorporating ampersand routines.*

```
10 LN = 510 + 171: GOSUB 60000: REM Point & vector to IN.OUT
20 & INPUT A$: PRINT
30 & PRINT A$
40 LN = 510: GOSUB 60000: REM Point & vector to DUMP
50 &
60 VTAB 23: END
60000  BINADR = (PEEK (175) + PEEK (176 ) * 256) - LN :
   REM find address of beginning of binary routine.
60010  P2 = INT (BINADR/ 256) :POKE 1015, P2 : P1 =
   BINADR - P2 * 256 : POKE 1014, P1: REM point
   ampersand vector to start of binary routine.
60020  RETURN
```

*End of listing.*

The first part of Dump is the launcher (bytes $2000–$2069), which installs the main program (bytes $2100–$21A9) just above HIMEM, and points the ampersand vector to the beginning of the main program. The launcher also determines whether you're using DOS 3.3 or ProDOS, and inserts the appropriate DOS output hooks. The main listing contains hooks for DOS 3.3; those for ProDOS are given at the end of the program. As written, Dump expects to find your printer in slot 1. If it's installed in a different slot, change byte $2132 to C*s*, where *s* is the slot number.

The main program can be relocated without the launcher if you insert the proper hooks for DOS 3.3 or ProDOS. You can then append it to the end of a BASIC program. (See "In & Out Update," Hints/Techniques, February 1987, p. 118.) By modifying slightly the program in that hint (ADD.IN.OUT), you can append and use IN.OUT (Hints/Techniques, December 1986, p. 174) and Dump in the same BASIC program.

First, using your word processor, convert **Listing 3** to a text file. EXEC the file to create Dump. Next, type in **Listing 4** and save it as ADD.DUMP. Finally, load your copy of ADD.IN.OUT and EXEC ADD.DUMP.

To use both programs as ampersand subroutines in your BASIC program, be sure the ampersand vector points to the correct subroutine before calling it. Before going to the subroutine at 60000, insert the proper value for LN by adding the lengths of all ampersand subroutines to the length of the BASIC subroutine they follow. Thus, the correct value for LN before calling IN.OUT is 510 + 171, and before calling Dump, 171. (See the example in **Listing 5**.) Now you can add as many of your own relocatable ampersand subroutines as you want to any BASIC program.■

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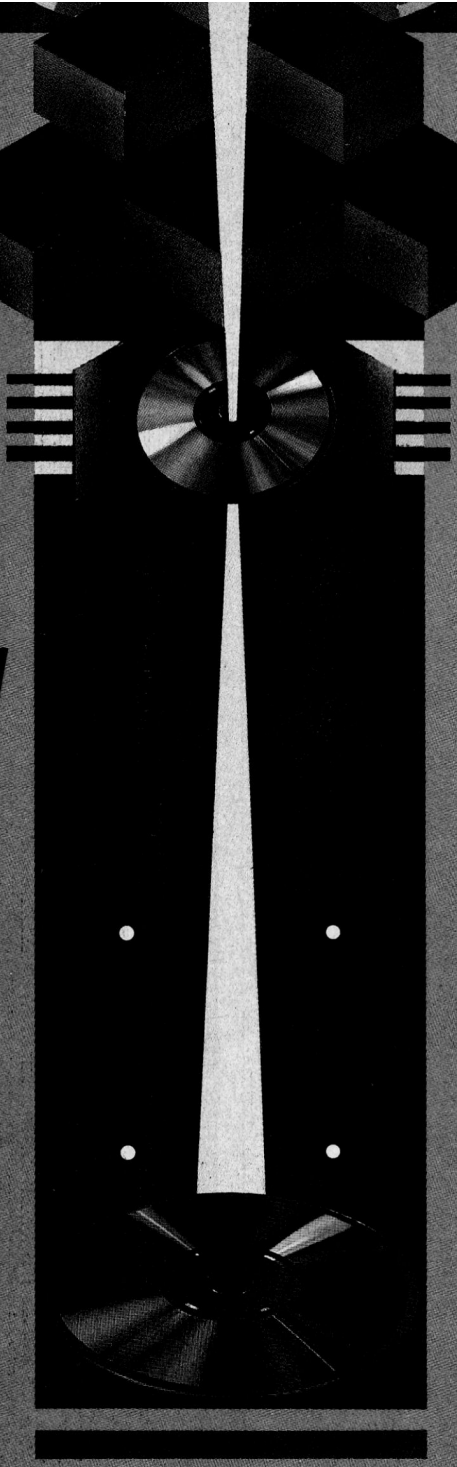

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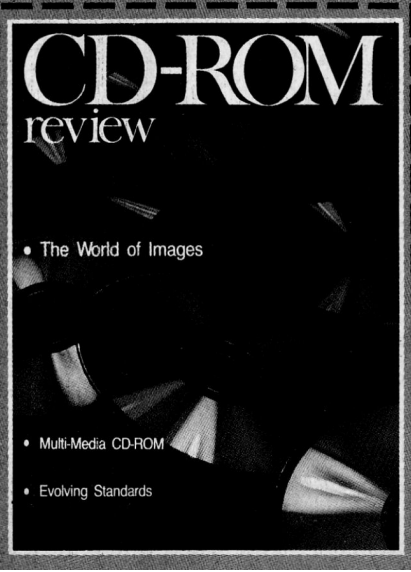

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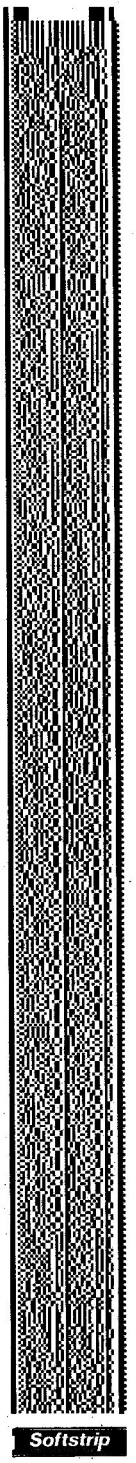

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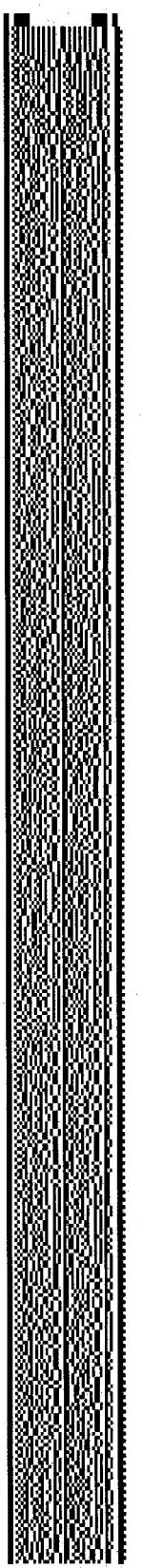

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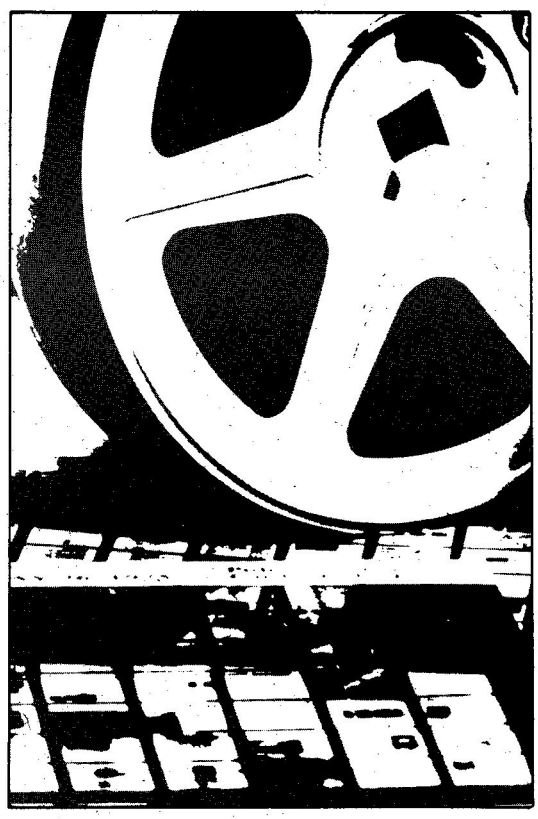

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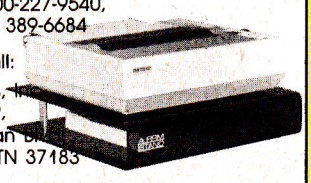

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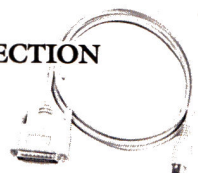

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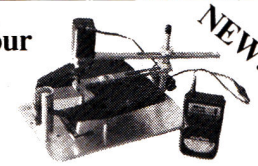


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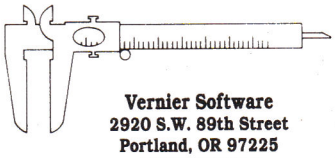

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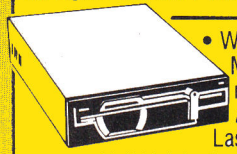

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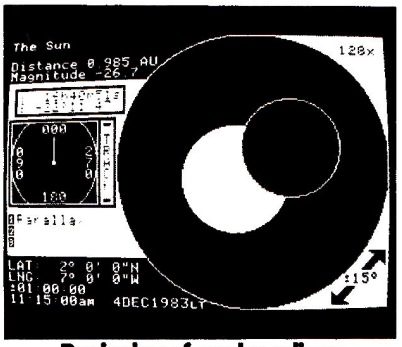


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# LifeGuard: All Is Not Lost

Even sophisticated IIGS owners make mistakes. Have you ever glanced at a disk catalog, said, "Oh, I don't need that," deleted a file, and then realized—whoops—you needed the file after all? Or have you ever erased a few files with generic names like LETTER.JUN12 and then thought, "Wait a second—wasn't one of those my letter to Ed McMahon accepting the $10 million sweepstakes award?"

Luckily, you now have a chance to bring the file back from beyond. **LifeGuard**, a new IIGS utility from Harbor Software, can recover an erased ProDOS file and give new life to a deleted document or program. It's a magic trick made famous by the Norton Utilities of the IBM world, but it's an easier, mouse-controlled job on the GS—as you might expect from Harbor programmer Phil Rosenzweig, whose last project was the 8-bit desktop MouseFiler.

Point and click on the "Disk" button or folder icon to choose a drive or directory, and LifeGuard shows side-by-side catalog windows listing active and deleted files. Select a deleted file, click on "Recover," and watch it move from the obituary to the active window, ready for use again. (You can also delete an unwanted or accidentally restored file, or click a "Map" or "Info" button to see a diagram of disk-space allocation or the size, type, and status of a file in either window.)

If you're not sure which subdirectory contains your bartending database or you've forgotten the name of a particular word-processing document, no sweat. LifeGuard's search function can find a whole or partial filename or files containing a specified text phrase or string of hexadecimal data. Pull-down menus let you search all files or focus on text, binary, or one of the three AppleWorks file types. The program can find deleted files as easily as active ones—not only might you forget which file contained the name "Ed McMahon," but you might forget you'd deleted it.

There are limitations, the main one being that you can't erase File Z, use the disk for a few days, then get File Z back. When ProDOS deletes a file, it leaves the contents intact, but marks that disk space available for later use; if you erase a file, then save a new one over that space, LifeGuard can't restore it.

The program we tested (version 1.0) could have been smoother in a couple of areas—for instance, you can flip easily between the two functions (search and recovery) in only one direction: A successful search leads automatically to the Recover window, though you can't start a search or use another pull-down menu until you quit recovering. It would be nice if the search function let you peek at a file in context, so that you wouldn't have to recover it, leave LifeGuard, then load the file into AppleWorks to discover it's a letter *from* Ed McMahon when you were looking for a letter *to* him.

Nevertheless, what LifeGuard does is impressive. Review Editor Eric Grevstad says, "On my data disks, AppleWorks' temporary work file obscured filenames shorter than 15 characters—an erased LETTER became LETTER-ORKS.TEMP. But I found files with no trouble, and got back recently deleted ones without a hitch. LifeGuard is easy enough for a panicking novice to use—and there might come a day you'll panic without it."

Technical Editor Paul Statt wishes LifeGuard "worked on the IIe and IIc as well as the GS. After all, Beagle Bros' Silicon Salad has been undeleting DOS 3.3 files since the days when ProDOS was only a gleam in some programmer's eye. Recovery ought to be a system feature of a powerful machine like the GS, but it's not. It's a good thing LifeGuard came along."

LifeGuard sells for $59.95 from Harbor Software Inc., 403 Great Road #8, Acton, MA 01720, (617) 263-1870. It runs on the IIGS under ProDOS 16 version 1.1, supplied on the 3½-inch LifeGuard disk (though it recovers files from ProDOS 5¼-inch or hard disks, too). ■

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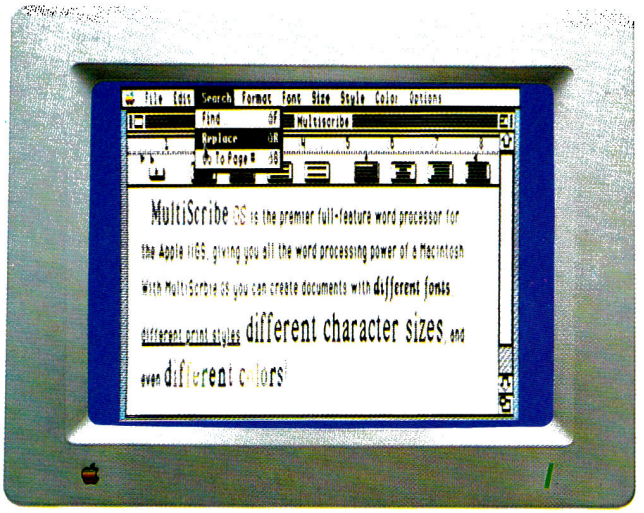


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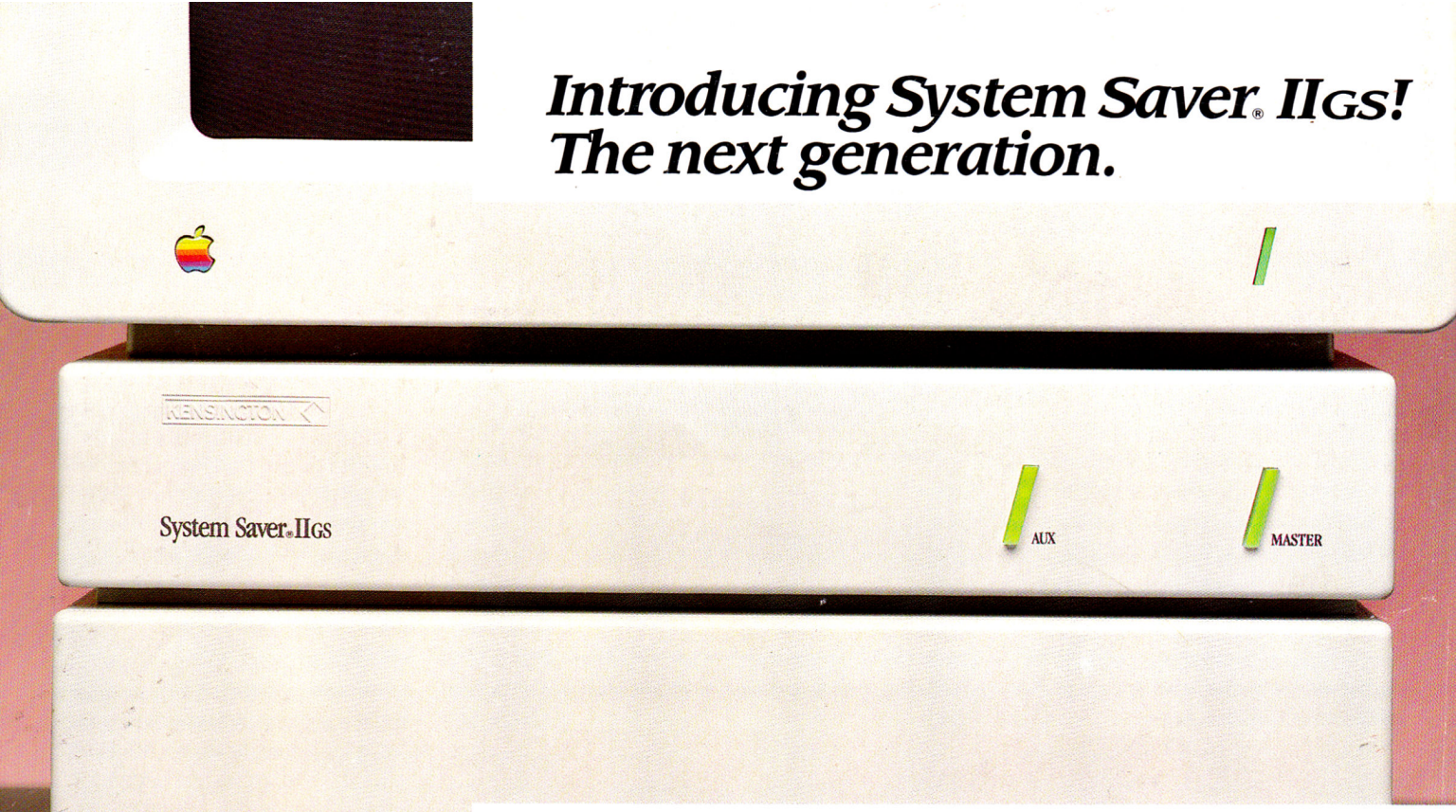


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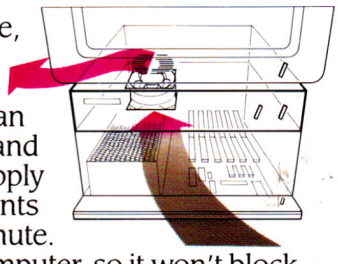

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